

POPULAR SCIENCE



APRIL • 35¢ *Monthly*

8 Best-Selling Small Cars

- Specifications
- Prices
- Driver Reports

SNARK: First 5,000-Mile

U.S. Missile Is Ready Now

Impartial X-Ray* Shows **RAMBLER** Leads All Low-Price Cars

**IN PERFORMANCE—HANDLING EASE
ECONOMY—SAFETY
COMFORT—TRADE-IN VALUE!**



**You Get The Straight Facts
On All Low-Price Cars In The
Revealing 32 Page
1958 X-RAY**

Page after page compares them all—point-by-point. You will learn exactly what you get for your motor car dollar. All data is taken directly from the official literature of automotive manufacturers and from automotive engineering publications. It is compiled in easy-to-read and easy-to-understand style. The few minutes you spend reading the 1958 X-Ray can well be the most valuable time you spend all year . . . time that can save you hundreds of dollars.



Before You Buy Any New Car—

***SEE YOUR RAMBLER DEALER
FOR YOUR FREE COPY OF
THE FACTUAL 1958 X-RAY!**

The profusely illustrated X-Ray is yours for the asking at your Rambler dealer's. Get your copy now. And while you're there, guest-drive a new 1958 Rambler 6 or V-8. Learn for yourself why Rambler rates tops under the discerning eyes of the X-Ray.

AMERICAN MOTORS CORPORATION



14250 Plymouth Road, Detroit 32, Michigan

Here's the *EASY, Step-by-Step* Way to **FIX ANY CAR IN A JIFFY!**

Engines, Brakes, Transmissions, Rear Ends, Generators—Yes, Any Part

**BRAND-NEW
EDITION!**



**Now—Whether You're a
Beginner or Expert Mechanic —
You Can "Lick" Any Auto Repair Job
on Any Car built from 1949 Thru 1958**

YES, now you can fix ANY part of ANY car—quickly, easily, and right! From carburetor adjustment to a complete overhaul, it's easy when you have MOTOR's famous Auto Repair Manual. It's like having a staff of factory experts and MOTOR's field-trained engineers beside you, guiding you every step of the way. No wonder so many thousands of beginner and expert mechanics alike use this step-by-step, illustrated giant manual.

MOTOR's Manual "starts from scratch"—leads you through entire job with easy step-by-step directions, clear "how-to" pictures. Tells you WHERE to start, what TOOLS to use. You just CAN'T go wrong!

**2,900 Pictures! So Complete
So Simple, You CAN'T Go Wrong!**

NEW, REVISED edition covers everything you need to know to repair any car. Over ONE THOUSAND giant pages. 2900 "This-Is-How" pictures lead you every step of the way. 291 "Quick-Check" charts—23,436 essential repair specifications. Over 225,000 service and repair facts on ALL 24 different makes from 1949 thru 1958. Instructions and pictures so clear you can't go wrong! Even a green beginner mechanic

can do a good job. And if

you're a top-notch mechanic, you'll be amazed by the time and labor-saving methods!

**The "Meat" of 176
Official Shop Manuals**

The editors have put together the "know-how" from 176 Official Shop Manuals and "boiled it down" into one fully-illustrated easy-to-understand guide.

Here's ILLUSTRATED step-by-step guidance on Automatic Transmissions, Air Suspensions, Ignition, Carburetors, Fuel Pumps, Steering Gears, Rear End, Brakes, PLUS MUCH MORE.

SEND NO MONEY

Try Book for a Week FREE

Just mail coupon. (Attach it to postcard if you wish.)

Test book in your garage or shop. **GUARANTEED** to pay for itself in 7 days. If it doesn't, return it, owe nothing. **MOTOR Book Dept., Desk 2D, 250 West 55th St., New York 19, N. Y.**

USED BY U. S. ARMED FORCES

Brand New—Covers All These Makes

Buick	Edsel	Oldsmobile
Cadillac	Ford	Packard
Chevrolet	Hudson	Plymouth
Chrysler	Imperial	Pontiac
Clipper	Jeep	Rambler
Continental	Lincoln	Studebaker
De Soto	Mercury	Thunderbird
Dodge	Nash	Willys

**Same FREE Offer on
MOTOR'S New
TRUCK MANUAL**

Covers EVERY job on EVERY popular make gasoline truck as well as GM and Cummins Diesels since 1949. For **FREE** trial, check coupon.

**Try Book
for a Week**

FREE

Beginner Raves About

Book . . . "Never knew anything about repairing cars until I got this wonderful book. Easy to see close-up pictures of every part. Has paid for itself time and time again."

—P. Pemper, Wisc.

So Does Expert

"Have been a mechanic for 25 years. MOTOR'S Manual still takes me out of the tight spots. And it's simple enough to be understood by average person."

—V. Lauria, Nev.

**MAIL COUPON NOW FOR 7-DAY FREE TRIAL
(Attach to Postcard if More Convenient)**

MOTOR BOOK DEPT.

Desk 2D, 250 W. 55th St., N. Y. 19, N. Y.

Rush to me at once (check box opposite book you want):

☐ **MOTOR'S New AUTO REPAIR MANUAL.** If O.K., I will remit \$2 in 7 days, \$2 monthly for 2 months and a final payment of \$1.95 (plus 35c delivery charges) one month after that. Otherwise I will return the book postpaid in 7 days. (Foreign price, remit \$10 cash with order.)

☐ **MOTOR'S New TRUCK REPAIR MANUAL.** If O.K., I will remit \$3 in 7 days, and \$2 monthly for 3 months, plus 35c delivery charges with final payment. Otherwise I will return book postpaid in 7 days. (Foreign price, remit \$11 cash with order.)

Print Name..... Age.....

Address

City..... State.....

☐ Check box and save 35c shipping charge by enclosing WITH coupon entire payment of \$7.95 for Auto Repair Manual (or \$9 for Truck Repair Manual). Same 7-day return-refund privilege applies.

APRIL 1958

Popular Science Monthly

April, 1958

Cover photograph by O. W. Link



Now engineers design new strength into tires, to carry you safely at tomorrow's speeds



While scientists try to develop more elaborate missiles, here's the U.S.'s bird-in-hand: the deadly, pinpoint-accurate Snark

AUTOMOBILES

[8 Best-Selling Small Cars · 83](#)

[Talking Prowl Car Warns Drivers · 98](#)

[Driving an Auto-Pilot Car · 105](#)

[Tires That Ride Softer, Last Longer · 118](#)

[First Day in a New Car · 195](#)

CONSUMER NEWS

[Bargain Boats Come in Kits · 150](#)

[Your Guide to '58 Power Mowers · 155](#)

[What's New · 160](#)

For Your Car · For Your Home

For the Home Shop · For the Handyman

Just for Fun

WORLD OF SCIENCE AND INDUSTRY

[What We Know About the Moon—So Far · 92](#)

[TV's New Trick: Hidden Commercials · 95](#)

[Breaking the Language Barrier · 101](#)

[New Radio Steals Power from the Air · 108](#)

[Our First 5,000-Mile Missile Is Ready · 110](#)

PICTURE NEWS

[Jet Power to Kick Off Missiles? · 128](#)

[Man-Made Suns May Harness the Atom · 134](#)

[Sea-Borne Conveyor Gets Dry-Land Test · 136](#)

[Jap Monorail Rolls on Rubber Wheels · 140](#)

Editor: HOWARD ALLAWAY

Managing Editor
FRANK ROWSOME JR.

Assistant Managing Editors
Charles M. Garvey
Kendall W. Goodwyn
Robert P. Stevenson

Senior Editors
Devon Francis
Martin Mann
Everett H. Ortner
Harry Walton

Technical Editor
Hubert Luckett

West Coast Editor
Wesley S. Griswold

Associate Editors

Erik H. Arctander
Alden P. Armagnac
Henry B. Comstock
Frank Dorr
Sheldon M. Gallagher
Herbert O. Johansen
Herbert R. Pfister
Maryann Smith
Ruth Westphal
Richard A. Yahraes

Editorial Assistants

Rosa Lee Beeland (Chief)
Annette Krauss (Research)
Anna Dallas, Bebe Lipson,
Roberta Marks, Georgette Sparks

Art Director

HOWARD C. JENSEN

Art Editors

Herbert Anthony
Reginald A. Hawley
Harry Samuels

Art Associates

Al Heighington
Eric A. Karminski Jr.
Henry W. Kazmirowski
Richard J. Meyer
Dana B. Rasmussen

Photography

W. W. Morris (Chief)
Robert D. Borst
Orlando Guerra

America's Leading New-Idea Magazine for 86 Years

SPECIAL FEATURES

- [We Took a Houseboat Vacation • 115](#)
[I Was Weightless for 39 Seconds • 123](#)
[Will a Super-City Swallow Your Town? • 143](#)
[No-Battery Flash Generates Own Power • 159](#)
[Are You Getting the Voltage You Pay For? • 164](#)
[You Can Pocket the Contractor's Profits • 173](#)
[Gus Treats a Case of Spring Fever • 200](#)



Vacation coming up? Read how to take a lazy-days houseboat cruise—at a bargain price

FOR HOME AND SHOP

- [6 Table-Saw Extras You Can Make • 170](#)
[PS Fix-It File: Stucco Repairs • 177](#)
Complete Tear-Out Booklet:
[When You Paint Your House • 179](#)
[PS Shop Notebook • 191](#)
[5 Rules for Keeping Whitewalls White • 192](#)
[Hints from the Model Garage • 205](#)
[I Built Hi-Fi into My Old Phonograph • 209](#)
[Pre-Amp Works Without Hum • 213](#)
[Short Cuts and Tips • 215](#)



PS shows you how six easily made accessories can take the pain out of table-saw work, put in new accuracy and safety. Pictures give you close-ups

EVERY MONTH . . .

- | | |
|---|--|
| PS Readers Talk Back • 6 | I'd Like to See Them Make • 22 |
| The Month in Science • 15 | You Ought to Know • 25 |
| Keeping the Home Shipshape • 18 | New Ideas from the Inventors • 147 |
| Prize Projects by PS Readers • 20 | Wordless Workshop • 168 |

Publisher
RALPH H. FLYNN

Advertising Manager
LEE P. ADAMS

Circulation Director
EUGENE WATSON

EDITORIAL OFFICES:
353 Fourth Ave., New York 10, N.Y.

ADVERTISING OFFICES:
NEW YORK—353 Fourth Ave.
CHICAGO—360 North Michigan Ave.
DETROIT—820 Book Bldg.
SAN FRANCISCO—114 Sansome St.
CLEVELAND—636 B. F. Keith Bldg.
LOS ANGELES—711 South Vermont.
PORTLAND, ORE.—520 S.W. Sixth Ave.

SUBSCRIPTION SERVICE:
Address all subscriptions and correspondence concerning them to: Subscription Department, 353 Fourth Ave., New York 10, N. Y. Allow four weeks' notice for change of address. Please give both old and new addresses, including zone numbers.

Published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, Chairman of the Board; Ralph H. Flynn, President and Treasurer; Franklin E. Parker Jr., Secretary; Eugene Watson, Vice-President. Second-class mail privileges authorized at New York, N. Y., and Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U.S.A. Copyright, 1958, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all the countries participating in the International Copyright Convention and Pan-American Copyright Convention. Single copy 35¢. Subscriptions to United States, its possessions, and Canada, 1 year \$3.40 (2 years \$6.00, 3 years \$8.00). Elsewhere, 1 year \$6.00 (2 years \$11.00, 3 years \$16.00).

APRIL 1958 3

BURIED **ALIVE!**



SIX YEARS ON THE SAME JOB WITH NEVER AN ACCIDENT...
AND THEN ONE MORNING...

2 A CAVE-IN PUT ME SIX FEET UNDER FOR SIX LONG MINUTES



3 IN THE HOSPITAL, I HAD PLENTY OF TIME TO THINK



4 I'D PASSED OVER DOZENS OF I.C.S. ADS IN POPULAR SCIENCE. BUT I SAW THIS ONE IN A NEW LIGHT



FREE!

I.C.S. CAREER KIT

Send coupon now...
get all three books

INTERNATIONAL CORRESPONDENCE SCHOOLS
BOX 21314D
SCRANTON 15, PA.

HOW'S IT GOING, DARLING?

FAST! I'M INTO HYDRAULICS ALREADY. AND I THOUGHT I WAS TOO OLD TO LEARN

SIGNING UP FOR THAT I.C.S. COURSE WAS THE SMARTEST THING I EVER DID

6 ONE MONTH LATER...

GOOD TO SEE YOU BACK ON YOUR FEET, JIM. IT'LL BE AWHILE BEFORE YOU'RE BACK IN THE FIELD. SO WE'LL FIX A TEMPORARY DESK FOR YOU IN THE OFFICE WHEN YOU'RE READY

I'M READY NOW, MR. WALSH

7 THEY GAVE ME SOME SIMPLE ASSIGNMENTS... AND I SURE SURPRISED THEM!

SAY, WHERE DID YOU LEARN ABOUT PUMPS?

SAME PLACE YOU DID, JOE... I.C.S.

8 THEN A FEW DAYS LATER, MR. WALSH CALLED ME IN...

JIM, I'M KEEPING YOU HERE AND PUTTING YOU ON SALARY. YOU'LL BE GETTING ABOUT \$20 MORE A WEEK. AND AT THE RATE YOU'RE GOING, I EXPECT I'LL HAVE TO RAISE THAT IN SIX MONTHS

HERE'S WHERE YOU COME IN! LET I.C.S. SHOW YOU THE WAY TO MORE PAY, RAPID ADVANCEMENT, REAL JOB SECURITY! MAIL THIS COUPON TODAY!

9 THAT EVENING, JANE AND I WENT HOUSE HUNTING

OH, JIM! IT'S A DREAM HOUSE!

AND THANKS TO I.C.S. IT'S A "DREAM" THAT CAN COME TRUE!

MODEL HOUSE

- 1 "HOW TO SUCCEED"
A 32-page gold mine of ideas
- 2 CAREER CATALOG
Opportunities in the field that interests you most
- 3 SAMPLE LESSON (MATH)
Shows the famous step-by-step I. C. S. teaching method



INTERNATIONAL CORRESPONDENCE SCHOOLS



BOX 21314D, SCRANTON 15, PENNA.

(Partial list of 257 courses)

Without cost or obligation, send me "HOW TO SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X (plus sample lesson):

- | | | | | |
|---|---|--|---|--|
| ARCHITECTURE and BUILDING CONSTRUCTION <ul style="list-style-type: none"> <input type="checkbox"/> Air Conditioning <input type="checkbox"/> Architecture <input type="checkbox"/> Arch. Drawing and Designing <input type="checkbox"/> Building Contractor <input type="checkbox"/> Building Estimator <input type="checkbox"/> Carpentry and Millwork <input type="checkbox"/> Carpenter Foreman <input type="checkbox"/> Heating <input type="checkbox"/> Interior Decoration <input type="checkbox"/> Painting Contractor <input type="checkbox"/> Plumbing <input type="checkbox"/> Reading Arch. Blueprints ART <ul style="list-style-type: none"> <input type="checkbox"/> Commercial Art <input type="checkbox"/> Magazine & Book Illus. <input type="checkbox"/> Show Card and Sign Lettering <input type="checkbox"/> Sketching and Painting AUTOMOTIVE <ul style="list-style-type: none"> <input type="checkbox"/> Automobiles <input type="checkbox"/> Auto Body Rebuilding and Refinishing <input type="checkbox"/> Auto Engine Tuneup <input type="checkbox"/> Auto Technician | AVIATION <ul style="list-style-type: none"> <input type="checkbox"/> Aero-Engineering Technology <input type="checkbox"/> Aircraft & Engine Mechanic BUSINESS <ul style="list-style-type: none"> <input type="checkbox"/> Accounting <input type="checkbox"/> Advertising <input type="checkbox"/> Business Administration <input type="checkbox"/> Business Management <input type="checkbox"/> Cost Accounting <input type="checkbox"/> Creative Salesmanship <input type="checkbox"/> Managing a Small Business <input type="checkbox"/> Professional Secretary <input type="checkbox"/> Public Accounting <input type="checkbox"/> Purchasing Agent <input type="checkbox"/> Salesmanship <input type="checkbox"/> Salesmanship and Management <input type="checkbox"/> Traffic Management CHEMICAL <ul style="list-style-type: none"> <input type="checkbox"/> Analytical Chemistry <input type="checkbox"/> Chemical Engineering <input type="checkbox"/> Chem. Lab. Technician <input type="checkbox"/> Elements of Nuclear Energy <input type="checkbox"/> General Chemistry <input type="checkbox"/> Natural Gas Prod. and Trans. <input type="checkbox"/> Petroleum Prod. and Engr. <input type="checkbox"/> Professional Engineer (Chem) <input type="checkbox"/> Pulp and Paper Making | CIVIL ENGINEERING <ul style="list-style-type: none"> <input type="checkbox"/> Civil Engineering <input type="checkbox"/> Construction Engineering <input type="checkbox"/> Highway Engineering <input type="checkbox"/> Professional Engineer (Civil) <input type="checkbox"/> Reading Struc. Blueprints <input type="checkbox"/> Structural Engineering <input type="checkbox"/> Surveying and Mapping DRAFTING <ul style="list-style-type: none"> <input type="checkbox"/> Aircraft Drafting <input type="checkbox"/> Architectural Drafting <input type="checkbox"/> Drafting Machine Design <input type="checkbox"/> Electrical Drafting <input type="checkbox"/> Mechanical Drafting <input type="checkbox"/> Sheet Metal Drafting <input type="checkbox"/> Structural Drafting ELECTRICAL <ul style="list-style-type: none"> <input type="checkbox"/> Electrical Engineering <input type="checkbox"/> Elec. Engr. Technician <input type="checkbox"/> Elec. Light and Power <input type="checkbox"/> Practical Electrician <input type="checkbox"/> Practical Lineman <input type="checkbox"/> Professional Engineer (Elec) HIGH SCHOOL <ul style="list-style-type: none"> <input type="checkbox"/> High School Diploma | <ul style="list-style-type: none"> <input type="checkbox"/> Good English <input type="checkbox"/> High School Mathematics <input type="checkbox"/> Short Story Writing LEADERSHIP <ul style="list-style-type: none"> <input type="checkbox"/> Industrial Foremanship <input type="checkbox"/> Industrial Supervision <input type="checkbox"/> Personnel-Labor Relations <input type="checkbox"/> Supervision MECHANICAL and SHOP <ul style="list-style-type: none"> <input type="checkbox"/> Diesel Engines <input type="checkbox"/> Gas-Elec. Welding <input type="checkbox"/> Industrial Engineering <input type="checkbox"/> Industrial Instrumentation <input type="checkbox"/> Industrial Metallurgy <input type="checkbox"/> Industrial Safety <input type="checkbox"/> Machine Design <input type="checkbox"/> Machine Shop Practice <input type="checkbox"/> Mechanical Engineering <input type="checkbox"/> Professional Engineer (Mech) <input type="checkbox"/> Quality Control <input type="checkbox"/> Reading Shop Blueprints <input type="checkbox"/> Refrigeration and Air Conditioning <input type="checkbox"/> Tool Design <input type="checkbox"/> Tool Making RADIO, TELEVISION <ul style="list-style-type: none"> <input type="checkbox"/> General Electronics Tech. | <ul style="list-style-type: none"> <input type="checkbox"/> Industrial Electronics <input type="checkbox"/> Practical Radio-TV Eng'r'g <input type="checkbox"/> Practical Telephony <input type="checkbox"/> Radio-TV Servicing RAILROAD <ul style="list-style-type: none"> <input type="checkbox"/> Car Inspector and Air Brake <input type="checkbox"/> Diesel Electrician <input type="checkbox"/> Diesel Engr. and Fireman <input type="checkbox"/> Diesel Locomotive STEAM and DIESEL POWER <ul style="list-style-type: none"> <input type="checkbox"/> Combustion Engineering <input type="checkbox"/> Power Plant Engineer <input type="checkbox"/> Stationary Diesel Engr. <input type="checkbox"/> Stationary Fireman TEXTILE <ul style="list-style-type: none"> <input type="checkbox"/> Carding and Spinning <input type="checkbox"/> Cotton Manufacture <input type="checkbox"/> Cotton Warping and Weaving <input type="checkbox"/> Loom Fixing Technician <input type="checkbox"/> Textile Designing <input type="checkbox"/> Textile Finishing & Dyeing <input type="checkbox"/> Throwing <input type="checkbox"/> Warping and Weaving <input type="checkbox"/> Worsted Manufacturing |
|---|---|--|---|--|

Name _____ Age _____ Home Address _____

City _____ Zone _____ State _____ Working Hours _____ A.M. to P.M. _____

Occupation _____

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special tuition rates to members of the U. S. Armed Forces.

PS Readers

TALK BACK

Car Owners Sound Off About Poll

DETROIT says they do make a plain-Jane car almost stripped of chrome and trim ["Are They Building the Car You Really Want?" Jan.], and hardly anybody buys it. What do they expect?

They fail to mention that the car is also stripped of radio, heater, V-8 engine, and other things that most people want, but have to buy the chrome to get.

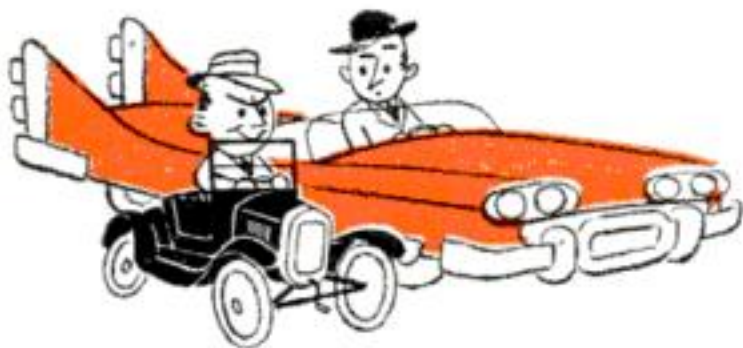
Consider the popularity of "custom" cars, many of which are stock jobs stripped of chrome and repainted. They look smoother and cleaner, and yet retain the more useful features of deluxe cars.

MICHAEL TUFFLEY, FT/3, FPO, NYC

... With regard to car size, what I want is something that will fit in my 20-year-old garage. Today's Chevrolet won't. My '32, '33 and '37 straight-eight Hudsons made it easily, yet they had ample interior room. If Chrysler "nearly lost its shirt" trying to move a small car, my answer is that conservative design was the only good feature of the car. No one in Detroit has ever built a really good reasonably sized auto, although some European luxury cars show that it can be done.

A. P. STEENSEN, Sharon, Mass.

... I'm beginning to believe that polls somehow miss a large and growing segment of car owners: people who keep what



they have because Detroit isn't building cars that please them.

W. B. HOWARD, Wilmington, N. C.

Girls, Boys and Delinquency

"WHY Girls Are So Good" [Jan.] carried a lot of food for thought. Has anyone ever stopped to consider how much the

automobile has contributed to juvenile delinquency?

Without a car, a juvenile couldn't do so much aimless running around in search of excitement, couldn't go so far from home, couldn't get away so fast when he does something wrong. The automobile has become an unsupervised clubroom for gangs and an unchaperoned lounge on wheels.

DON HILL, Los Angeles

... To compare the actions of the sexes, you must first compare the inherent drives that lead to these actions. There is a vast difference in the drives of each sex and I wouldn't alter this, even if it could be done. I'm just old-fashioned enough to like the idea of two sexes. Your article failed to mention:

1. That our legal system is based on the idea that the object of laws is to control men.

2. That a first responsibility of each male is the control of women.

3. That our failure to teach youth to accept this responsibility is probably the cause of 80 percent of our crime.

What we need is a vigorous campaign to teach our youth their responsibilities and how best to manage them.

J. R. HARPER, Keego Harbor, Mich.



Russian Tour Draws Bouquet and Frown

EDITOR Walton's open mind, demonstrated in his piece on Russian technology [Jan.], is something the world needs very badly.

Not so long ago, another American magazine reported on Russian fashions, telling how dull and dowdy the clothing is. There was no apparent understanding that the Russians are different people with different needs and a different economic stress than ours.

Harry Walton seems to feel no need to judge; rather, he reports on what is available to Russians and how it fills

WHAT HAPPENS WHEN A MAN DECIDES TO DO SOMETHING! ABOUT HIS FUTURE!

The proven rule of "learn more to earn more" took M.E.F. (name on request) from a position of truck driver to that of an accounting executive in sixteen months. Listen to what M.E.F. says:

"I was driving a truck—working long hours and not making much money. I had a burning desire to better myself in life, and decided to enroll with LaSalle. I went along driving my truck days and studying nights and got my first break after completing 35 assignments. I took a cost accounting position. Within one month after starting full-time, I received my first raise, thereafter followed more. One of the greatest thrills of my life came just nineteen months after I started with LaSalle. When our firm opened up a branch office, I was assigned to take charge of the Accounting Department and my salary has doubled."

M.E.F. took a proved road to success—and his letter is typical of the thousands we have in our files from men and women in all walks of life.

YOU DESERVE SUCCESS

There is no reason why you can't win success through LaSalle's Accounting Training. Today the demand for good accountants far exceeds the supply. This spells real opportunity to the man who is prepared.

You need no special talents to become a success in Accounting. You do not even need a preliminary knowledge of bookkeeping. All you need is the will to work—to achieve success perhaps years sooner.

Under the LaSalle Problem Method you can acquire a thorough knowledge of Accounting—you can master its fundamental principles—become expert in the practical application of those principles. You learn by doing—without losing any time from your present work. You train directly under the supervision of a competent staff of Certified Public Accountants and accounting experts.



TWO FREE BOOKS

We offer you a FREE SAMPLE LESSON so that you can *prove to yourself* that you can master Accounting—quickly, thoroughly—in spare time at home. You'll see exactly how LaSalle's famous "problem method" works . . . how you are led step-by-step through actual accounting work—learning by doing and not by study of theory alone. Along with the sample lesson you will receive FREE the valuable book, "Opportunities in Accounting." It explains how we train you from the ground up—or from where you are now—according to your individual needs.

Send the coupon RIGHT NOW. Don't lay it aside and say you'll do it later. It can be the means of your SUCCESS—perhaps larger success than you have ever dreamed. At least it's worth considering.

ACCREDITED MEMBER, NATIONAL HOME STUDY COUNCIL





SEND FOR FREE BOOK

LaSalle Extension University

— A Correspondence Institution —

Dept. 483 H 417 S. Dearborn St., Chicago 5, Ill.

Please send me, free of all cost or obligation, a sample lesson in Accounting . . . also, your latest illustrated book, "Opportunities in Accounting."

Name Age

Address

City, Zone, State

APRIL 1958 7

**PUT ME TO WORK
IN YOUR ENGINE**



**I'LL PROTECT THE
PERFORMANCE YOU
BOUGHT**



Men who know motors recognize the Economy of Kendall, The 2000 Mile Oil Quality. It's refined from 100% Bradford Pennsylvania Crude Oil, with nature's "miracle molecule" at its best. It gives your motor better lubrication. In return you save through greater oil mileage, less wear, less need of repair. Prove it in your car.

Ask your favorite dealer
for it now

**KENDALL REFINING COMPANY
BRADFORD, PENNA.**

their needs. To him, the Russian is a human being—certainly a refreshing point of view.

G. H. CARDOZO, Greens Farms, Conn.

... It was a pleasure to be with Harry Walton on our trip through Russia, and the picture story in February POPULAR SCIENCE ["Inside Russia by Car"] was a delight to my family and friends. But the lack of picture credits has kept me busy explaining which photographs I took and which he did.

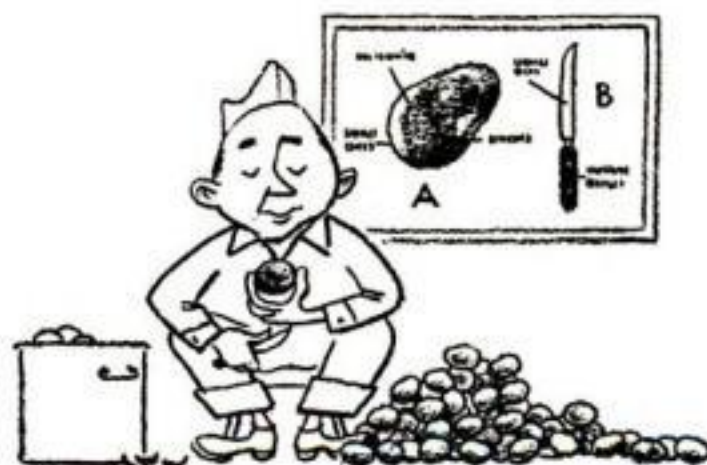
DENNIS M. O'CONNOR, Maplewood, N. J.

Sorry. O'Connor snapped those on pages 94-95, the three big ones on 96-97, and the three small ones on page 98. Walton also points out that, though he set up the cover picture, it was O'Connor who deftly snapped it, with Walton in the car.

A GI Says It Isn't So

YOUR chance of learning a trade in military service [Jan.] is the bunk. I've been in the Air Force since 1954 and not a tenth of the men I know are working at a trade they know, or learning one.

Why don't you tell parents about the Air Police who guard aircraft, or the GIs



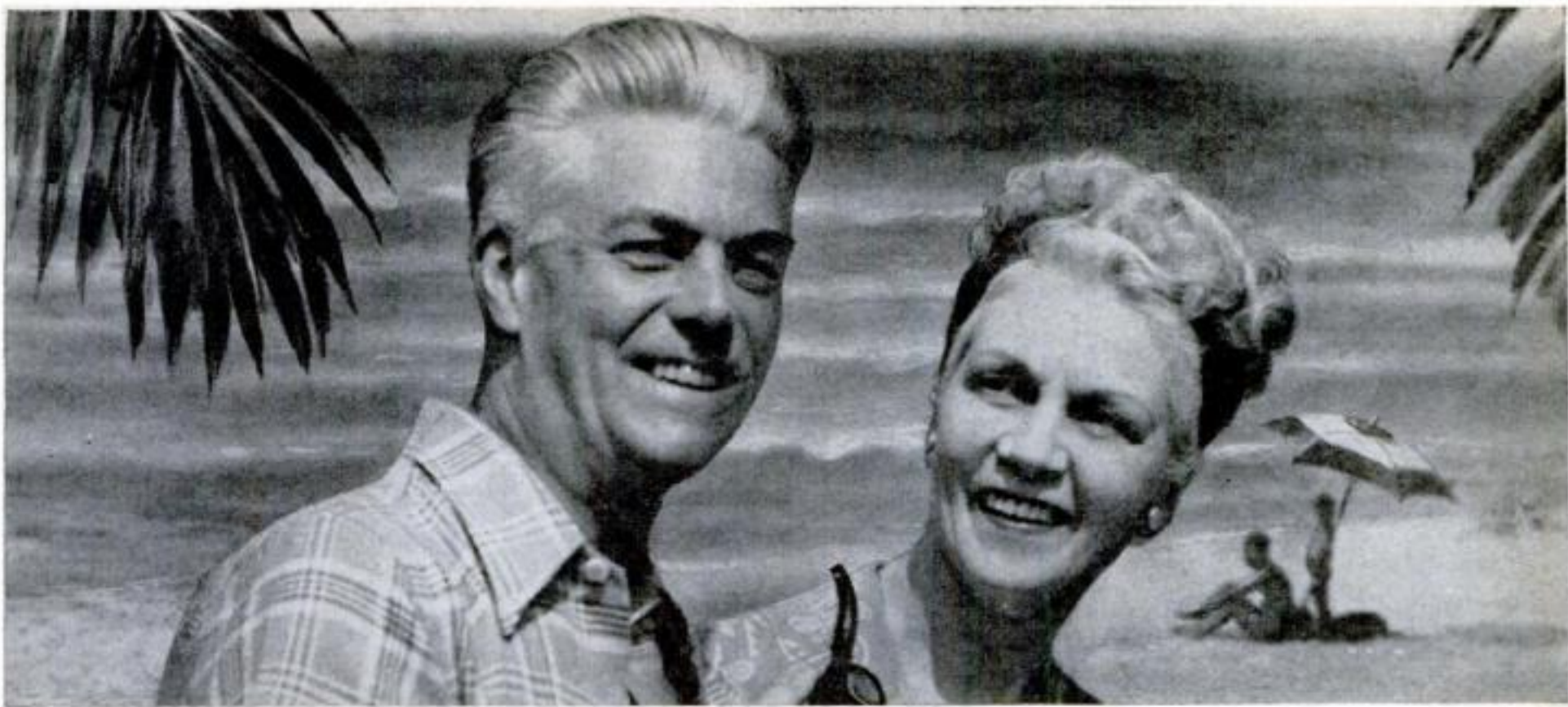
who pull KP—and nothing but KP—for four years? What trade are they learning?

Military needs come first and if you are not in the right place at the right time, you can kiss good-bye that trade you hoped to learn.

Name withheld
U. S. Air Force

Plutocrats of the Open Road?

THAT picture of a Kenworth truck [Dec., p. 250] made me wonder why you don't run more on trucks. Thousands of drivers ride sleeper rigs and many read your magazine. Maybe you don't know the modern truck driver. He is not the uneducated, rough, tough, homeless tramp



How we retired in 15 years with \$300 a month

"Here we are, living in Southern California. We've a little house just a few minutes' walk from the beach, with flowers and sunshine all year. For, you see, I've retired. We're getting a check for \$300 a month that will keep us financially independent as long as we live.

"But if it *weren't* for that \$300, we'd still be living in Forest Hills, and I'd still be working. Strangely, it's thanks to something that happened, by chance, in 1941. It was August 17, my fortieth birthday.

"To celebrate, Peg and I were going out to the movies. While she went upstairs to dress, I picked up a magazine and leafed through it idly. Then somehow my eyes rested on an ad. It said, 'You don't have to be rich to retire.' And just that evening Peg and I had been saying how

hard it was for us to put anything aside for our future.

"Well, we'd certainly never been rich. We spent money as fast as it came in. And here I was forty already. Half my working years were gone. Someday I might not be able to go on working so hard. What then?

"This ad told of a way that a man of 40—with no big bank account, but just fifteen or twenty good earning years ahead—could get a guaranteed income of \$300 a month. It was called the Phoenix Mutual Retirement Income Plan. No harm in looking into it, I thought. When Peg came down, I was tearing a corner off the page. First coupon in my life I had ever clipped. I mailed it on our way to the movies that night.

"Fifteen years slide by mighty fast. Times changed . . . hard

times came . . . the war. I couldn't foresee them. But my Phoenix Mutual Plan was one thing I never had to worry about! 1956 came . . . I got my first Phoenix Mutual check—and *retired!* We sold the house and drove west. It's a new kind of life. Best of all, we've security a rich family might envy. Our \$300 a month will keep coming as long as we live."

Send for Free Booklet

This story is typical. Assuming you start at a young enough age, you can plan to have an income of \$20 a month to \$3,600 a year or more—beginning at age 55, 60, 65 or older. Send the coupon and receive, by mail and without charge, a booklet which tells about the Phoenix Mutual Plans. Similar plans are available for women. Don't delay. Send for your copy now.

ESTABLISHED 1851

PHOENIX MUTUAL

Retirement Income Plan

GUARANTEES YOUR FUTURE

OVER 100 YEARS OF LIFE INSURANCE PROTECTION
FOR BUSINESS AND FAMILIES

COPYRIGHT 1957, BY PHOENIX MUTUAL LIFE INSURANCE COMPANY

PHOENIX MUTUAL LIFE INSURANCE CO.
254 Elm Street, Hartford 15, Conn.

Please send me, without obligation, your free 28-page book showing new retirement income plans.

☐ Plan for Men

☐ Plan for Women

Name _____

Date of Birth _____

Business Address _____

Home Address _____

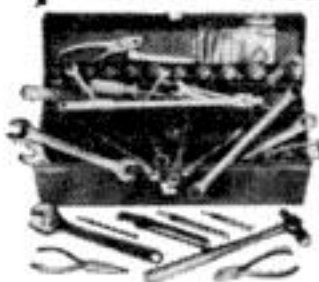


Train at Home for a Top-Pay Job in **AUTO MECHANICS**

Skill adds many extra dollars to your pay check. This is especially true in the auto field, where *100,000 mechanics are needed*. Average pay in some areas is \$3 per hour. It's easy to train at home in spare time for a secure job with a bright future, in America's No. 1 industry. *Mail coupon for full details*. No cost nor obligation.

Get Experience Using Tune-Up Kit & Tools

(included with training)



CTI sends you a Tune-Up Kit, the kind that skilled mechanics use to locate engine troubles. You receive a compression Tester; Vacuum Gauge & Fuel Pump Tester; Ignition Timing Light; portable steel case. You also get mechanic's tools, including socket set. You acquire experience using kits.

DIESEL MECHANICS OR BODY-FENDER REBUILDING is yours at no extra cost. Only CTI offers this extra choice. You get fully-rounded training in all phases of mechanics.

Many Students Earn Money as They Train

by taking part-time jobs in local shops or fixing cars "on their own." Many make enough to pay all tuition and buy extra equipment. Some open shops, become independent.

Get Facts Now—Decide Later

Your future is worth looking into. Get facts on job and business opportunities. Mail coupon today—Commercial Trades Institute, Chicago 26, Ill.

**MAIL TODAY
FREE
BOOKLETS**

COMMERCIAL TRADES INSTITUTE

1400 GREENLEAF AVENUE
CHICAGO 26, ILLINOIS

DEPT. A-785

Send booklet, *Big Money in Auto Mechanics*, and *Sample Lesson*. Both are FREE.

Name _____ Age _____

Address _____

City _____ Zone _____ State _____



of a few years back. Most of the large companies give aptitude tests that call for a high-school education and a high IQ. The average pay for a sleeper driver may go as high as \$1,000 per month. Most of these men are married and own their own homes. They have quite a knack with tools and like your articles.

The Cummins diesel is the most popular engine in the big rigs. They have a new water-cooled turbo-supercharger powered by exhaust gas. I drive a 60-foot Peter-built tanker with a 200-horse Cummins engine. It is a sleeper rig. We haul 8,600 gallons of gasoline.

M. M. PARSONS, Salt Lake City

Age Creeping Up on Gus?

JUST read your January issue and find myself slightly confused.

Gus says [p. 238] if a gas station puts antifreeze in an air hose to prevent icing, "there's a possibility of getting alcohol fumes in tires. Spark a charge of static electricity in them—and boom!"

William Carroll [p.122] says the extra windshield-washer bottle on Chevrolet air-suspension cars "holds anti-icing alcohol for the air compressor."

If Gus is right, then look out! The "Hot One" will be hotter—0 to 60 m.p.h. in two seconds, straight up!

J. ZAJACKOWSKI, Philadelphia



Sioux City's Sioux Saw

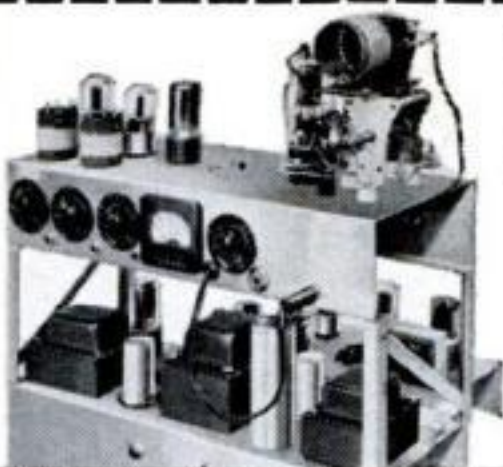
THAT was a fine article on power saws in your January issue ["How to Choose a Portable Saw"]. There were one or two saws there I never heard of. Then there's one I have heard of but, apparently, you haven't.

The name is SIOUX. It's manufactured by Albertson & Co., Sioux City, Iowa.

C. W. STEVENSON, Minneapolis

Sixth PS Award Brings Applause

IT HAS just come to my attention that POPULAR SCIENCE has won the special merit award of the National Safety Council for the sixth consecutive year. For such continuous outstanding performance in the field of safety on the highways, the

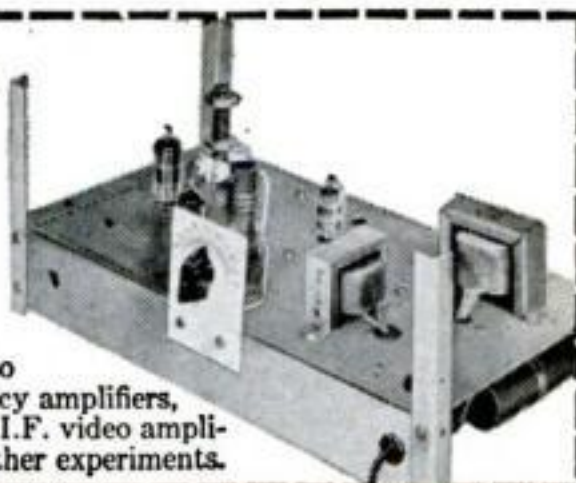


YOU BUILD Broadcasting Transmitter

As part of N.R.I. Communications Course you build this low power Transmitter; use it to learn methods required of commercial broadcasting operators, train for FCC license.

YOU BUILD Signal Generator

N.R.I. sends kits of parts to build this Signal Generator. You get practical experience, conduct tests to compensate Radio frequency amplifiers, practice aligning a typical I.F. video amplifier in TV circuit, many other experiments.



YOU BUILD Vacuum Tube Voltmeter

Use it to get practical experience, earn extra cash fixing neighbors' sets in spare time, gain knowledge to help you work in Radio, Television, Color TV. With N.R.I. training you work on circuits common to both Radio and TV. Equipment you build "brings to life" things you learn in N.R.I.'s easy-to-understand lessons. 64 page Catalog FREE, shows all equipment you get.



YOU BUILD AC-DC Superhet Receiver

N.R.I. servicing training supplies all parts, everything is yours to keep. Nothing takes the place of practical experience. You get actual servicing experience by practicing with this modern receiver; you learn-by-doing.



Learn RADIO TELEVISION *by Practicing at Home*

WHAT GRADUATES DO AND SAY **NEED FOR TECHNICIANS INCREASING Fast Growing Field Offers Good Pay, Bright Future**

Chief Engineer

"I am Chief Engineer of Station KGCN in Mandan, N. D. I also have my own spare time business servicing high frequency two-way communications systems." R. BARNETT, Bismarck, North Dakota.



Paid for Instruments

"I am doing very well in spare time TV and Radio. Sometimes have three TV jobs waiting and also fix car Radios for garages. I paid for instruments out of earnings." G. F. SEAMAN, New York, N. Y.



Has Own TV Business

"We have an appliance store with our Radio and TV servicing, and get TV repairs. During my Army service, NRI training helped get me a top rated job." W. M. WEIDNER, Fairfax, South Dakota.



Today's OPPORTUNITY field is Radio-Television. Over 125 million home Radios plus 30 million sets in cars and 40,000,000 Television sets mean big money for trained Radio-TV Technicians. More than 4,000 Radio and TV Broadcasting stations offer interesting and important positions for technicians, operators. Color television, portable TV sets, Hi-Fi, other developments assure future growth.

It's the trained man who gets ahead. The fellow who uses his spare time to develop knowledge and skill gets the better job, drives a better car, lives in a better home, is respected for what he knows

and can do. So plan now to get into Radio-TV.

Keep your job while training with N.R.I. You learn at home in your spare time. N.R.I. is oldest and largest home study Radio-TV School. Our methods have proved successful for more than 40 years, provide practical experience.

Soon after enrolling, many N.R.I. students start to earn \$10, \$15 a week extra in spare time fixing sets. Many open their own full time Radio-TV shops after getting N.R.I. Diploma. Find out more. Mail Coupon. Cost is low, terms easy; includes all equipment. Address: **National Radio Institute, Dept. 8DB, Washington 16, D.C.**

**Send for
LESSON
and CATALOG
FREE**

VETERANS
Available under
G.I. Bills



MAIL COUPON NOW

NATIONAL RADIO INSTITUTE
Dept. 8DB, Washington 16, D. C.

Mail me Sample Lesson and 64-Page Catalog, FREE. (No Salesman will call. Please write plainly.)

Name _____ Age _____

Address _____

City _____ Zone _____ State _____

ACCREDITED MEMBER, NATIONAL HOME STUDY COUNCIL

SHOPMATE®



ALL-NEW JIG SAW

There has never been a jig saw like this! It has *everything* . . . every conceivable feature to make sawing easier and more professional, plus the lowest possible price! With its three special blades, you can do the work of seven other saws: rip, band, coping, crosscut, scroll, key-hole, and hack saw!

NO OTHER JIG SAW HAS SO MANY FEATURES—YET IS PRICED SO LOW!

- See-As-You-Saw Jig Lite!
- Left or Right Angle Adjustment to 45°!
- Eight Inch Rip Fence and Circle Guide!
- Auxiliary Guide Handle!
- Fast Cutting—2650 Strokes Per Minute!
- Powerful Airjet Blows Away Sawdust!
- Perfect Balance and Compact Design!
- Light Weight—Weighs Only 5¼ Pounds!

**CUTS 2x4's,
PERFECT CIRCLES,
BEVELS TO 45°!**



\$29⁹⁵
COMPLETE

For complete information, write to . . .

PORTABLE ELECTRIC TOOLS, INC.
Dept. P548 • 320 West 83rd Street • Chicago 20, Illinois

membership of the Independent Garage Owners of America salutes you.

RALPH H. JAMES, Ex. Dir.,
IGO-A, Inc., Tulsa

Correspondence School Speaks Up

"PLAIN Facts About Correspondence Schools" [Feb.] was interesting and well done. But there is an inaccuracy concerning Alexander Hamilton Institute which I think you would like to have cleared up.

With each of the 26 texts of our Modern Business course, we send the student a problem he is supposed to study. He then returns his solution to us, we constructively criticize it and grade it, and return it with a Model Solution for comparison with his own. Thereafter, he is free to enter a defense of his viewpoint or ask for further information or clarification on any point.

M. B. FOSTER, Pres.
Alexander Hamilton Institute, NYC

. . . I took a course by mail (carpentry foreman) about four years ago and I got took—most of it dealt with practices 25 years old or more. I learned nothing but where wood comes from.

There was nothing about new types of windows such as sliders and jalousies. There was nothing on sheathing exterior walls while still laying on the deck, or putting cornice on while walls are flat; and FHA and VA minimums for building were ignored. I am now a carpenter foreman and layout man, but all my knowledge came from building-specification books and trade journals, plus actual work in the trade. These schools may be okay on electronics, but they need to update many other courses. The building trade is nothing to tackle 1910 style.

WALTER MARTYNOW, Livonia, Mich.

Dye Locates Transmission Leak

IN DISCUSSING the automatic transmission in "How to Hunt Down an Oil Leak" [Jan.], you mention the difficulty of determining where a leak is coming from: transmission or engine. As an auto repairman, I can suggest a simple test:

Mix one tablespoon of dye (we use a DuPont red organic dye) in a minimum of one quart of oil drained from the engine. Pour it back and red seepage will signal a leak in the engine.

C. L. ZIEBARTH, Winsted, Minn.

**NO
PREVIOUS
TECHNICAL
EXPERIENCE
REQUIRED!**

**NO
ADVANCED
EDUCATION
NEEDED!**

MEN 17-55

**Prepare now to enter one of the
many profitable branches of**

ELECTRONICS

SEND FOR FREE FACTS!

The day SPUTNIK spiraled into outer space will be known to thousands of men throughout the United States and Canada as "Opportunity Day" — because it brought to light the tremendous possibilities that the field of Electronics holds for the man who seeks a better job or a business of his own.

One of the great things about the giant field of Electronics is the fact that even a man who does not have an advanced education or previous technical experience can prepare for many profitable opportunities in his spare time at home . . . or, if he desires, he may attend our well-equipped Chicago or Toronto laboratories.

If you seek a better job or a business of your own, why don't you fill in the coupon below for FREE facts?

Make "SPUTNIK Day" your "Opportunity Day," too!

Draft Age?

We have valuable information for every man of draft age; so if you are subject to military service be sure to check the coupon.

Live-Wire Employment Service

Through long-established contacts with well-known employers, DeVry Tech's Placement Department has helped many men toward better jobs in Communications, Guided Missile Control, Radar, Automation, Television, Instrumentation, etc. The service is free to graduates.

SEND for FREE BOOKLET

We'll give you a free copy of an interesting booklet, "Electronics and YOU." See for yourself how you may take advantage of the opportunities in this fast-growing field.



**Will Not
Interfere with
Your Present
Job!**

**Part Time
Income Possible
While Learning!**

**Get into
One of Today's
Fastest Growing
Fields!**

**In Your Spare
Time at Home or
in Our Chicago or
Toronto Laboratories**

DeVRY *Technical* INSTITUTE
Chicago 41, Illinois

Formerly DeForest's Training, Inc.
Accredited Member of National Home Study Council

"One of North
America's Foremost
Electronics
Training Centers"



MAIL COUPON TODAY!

DeVry Technical Institute
4141 Belmont Ave., Chicago 41, Ill., Dept. PS-4-O
Please give me your FREE booklet, "Electronics and YOU," and tell me how I may prepare to enter one or more branches of Electronics.

Name _____ Age _____
(PLEASE PRINT)

Street _____ Apt. _____

City _____ Zone _____ State _____

☐ Check here if subject to Military Training.

DeVry Tech's Canadian Training Center is located at
626 Roselawn Avenue, Toronto 12, Ontario.

2038

Where the Living is Easy....



GULF PARK ESTATES



\$8

GIVES YOU A SHARE IN THE FUTURE OF
MISSISSIPPI'S FABULOUS GULF COAST!

FOR A VACATION
FOR A RETIREMENT
FOR AN INVESTMENT

MULTI-MILLION DOLLAR DEVELOPMENT. APPROXIMATELY 10,000 HOMESITES.

\$8 DOWN, \$8 MONTHLY 1/4-ACRE HOMESITE (75' x 150')

**TOTAL COST
\$895**

Above less 10% discount with \$100 down,
\$8 per month. 15% discount for cash payment in full.

**\$6,000 restricted area or
\$695 in \$3,000 restricted area or Mobile homes**

On The Beautiful Gulf of Mexico

Located on the Mississippi Gulf Coast where white beaches extend 60 miles. Bays, Bayous, Rivers, offer fresh and salt water fishing, every water sport, in Gulf Park Estates; golf, riding, hunting, nearby. Entrance: 3 miles East of Ocean Springs on Old Highway 90, just across the Bay from Biloxi.

Ideal Climate Year-'Round

Gulf Park Estates offers ideal climate you'll find anywhere with annual average temperatures ranging from 67 to 71 degrees. The summers are comfortably cool and the winters are mild, unlike most neighboring areas where it gets stiflingly hot. This community grows citrus fruits, vegetables, abundantly. In winter there is seldom a chilly day, practically no frost. Ideal climate for asthma, sinus and arthritis.

Orders from this ad will be assigned corner lots as long as available.
START PLANNING YOUR FUTURE TODAY! SEND \$8 DEPOSIT.

A WONDERFUL INVESTMENT!

We confidently predict that the \$895 Gulf Park Estates Homesites will be going at nearer \$5,000 within 2 years. Our lots have already advanced \$200 within the last 30 days. We expect to sell 75% of the 10,000 lots in the next 12 months. Invest small amount now and reap big profits tomorrow. You may come choose your lots personally, if you wish, or you may trade or exchange your lots at any time for any other lots available at prevailing printed prices. Buy now. Get on the ground floor. The state of Mississippi has a \$5,000 tax exemption on homes. Taxes are a low 66 mills in Gulf Park Estates. You may choose your own contractor; however we will assist you on request. Build or sell any time you wish.

Planned community— Every Homesite on Paved Road

Gulf Park Estates will reserve space for Shopping Centers, Parks, Churches, Schools, and Yacht and Country Club with boat harbor for all property owners. Some roads are already paved and a guarantee goes with each purchase at the fronting street will be paved or a suitable exchange made. Electricity and telephone lines are already in. Bottled gas is available until nearby natural gas can be piped in. Natural gas is nearby and undoubtedly will be available in the property soon. All property owners have privilege of entire beach and inland boat harbor. Elevation is 5 to 20 ft. Guaranteed all high and dry. Many beautiful homes now exist in the Gulf Park Estates area. Artesian water is available to each homesite. You'll enjoy meeting thousands of people who come here yearly, either for a vacation or for permanent residence. Living is at its best on the Mississippi Gulf Coast. The people are friendly and neighborly; and living is economical.

1,000 MILES NEARER YOUR HOME

The Mississippi Gulf Coast is 1,000 miles nearer than most midwestern areas where many communities similar to Gulf Park Estates are now being developed. You save at least 2 days driving time. Start Planning Your Future Today! Send \$8 Deposit.

Completely Descriptive Literature!

Send us \$8 deposit on your homesite today and we will mail you plat and map showing location and abundant descriptive literature about the Mississippi Gulf Coast and Gulf Park Estates; also, actual photo of your lot for approval. Your money will be returned if you decide not to buy within ninety days.

PRICES INCLUDE:

Artesian deep well flowing water piped to your property. Road paving.
Taxes and interest while paying.
All deed costs, with title guarantee policy.
100 shrubs and palms for landscaping.
Land cleared with our bulldozer if desired.
We make it easy for you to move on your property.
Restrictions: \$10,000 Homes, or 1,000 sq. ft. main floor space, 400 acres reserved for \$3,000 homes and trailers.
For reference, contact Peoples Bank, Biloxi, Mississippi.

**GULF PARK ESTATES, Dept. PS-4
Hdq: Briarfield Ave.—3 blocks from Beach
BILOXI, MISSISSIPPI**

Send Coupon Plus \$8 Deposit Today.

**GULF PARK ESTATES, Dept. PS-4
Pink House, West Beach, Biloxi, Miss.**

Reserve for me homesites. Enclosed is deposit or full payment on each homesite. Send contract and map showing location. It is understood that my deposit (or cash payment) will be returned without question if I request it within 90 days.

Name.....

Address.....

City..... Zone..... State.....

The month in science

.....

Shoot for space. Sophisticated scale-ups of the good old Fourth-of-July skyrocket look better and better for the ride into space. The experts are turning back toward solid, gunpowder-type fuels, the kind first used in rocketry but more recently limited to small (comparatively speaking) missiles. One sign: successive speed-ups in work on Navy's solid-fuel, submarine-launched Polaris.

- ▶ Big rockets now use liquid propellants: an oxidizer (LOX, fuming nitric acid) and a fuel (gasoline, liquid hydrazine). These are pumped from separate tanks to a combustion chamber where they mix and burn to create the gases that drive the rocket up.
- ▶ It's complicated. You need pumps, valves, other intricate equipment. Worse, this all has to be checked out, and fuel tanks loaded, just before firing in a torturous countdown. One Vanguard countdown ran four days before it was abandoned.
- ▶ Solid-fuel rockets are simpler. They come ready to fire, with propellant factory-loaded inside their combustion chambers.
- ▶ Typical propellants: cellulose nitrate plasticized with glycerol trinitrate (that's smokeless powder), ammonium perchlorate mixed in resinous fuel. These are cast in place while still liquid, or made into pellets and then packed into the rocket.

A major factor in the swing toward solid fuels: the Army-Navy sprint for second in the big satellite race.

Navy's Vanguard has two liquid engines, one solid. Three launching flops involved the liquid stages.

Army's Jupiter C, which did put a Made-in-U.S.A. moon up, has one liquid stage (a modified Redstone missile), three solid stages (scaled-down Sergeant missiles—a cluster of 11 for stage 2, five for stage 3, one for the now-orbiting stage 4).

Another factor: Much bigger and more powerful solid-fuel rockets can be made today. Some boron compounds, which make super fuels for liquid-powered rockets, are solid materials, could be used in solid rockets.

Lockheed's X-17 research missile is a sample of what can be done. It is 40 feet overall, has three stages (all solid fuel), is reported to have flown 4,000 miles high. According to rocketman H. W. Ritchey, addition of a fourth stage would make it a good satellite launcher (15- to 20-pound payload).

Don't underestimate the power of the liquids, though. By the time solid propellants are ready for space ships, liquid engines will be improved, too. Very complicated machinery can attain high reliability (one example: the modern auto engine).

But right now solid fuels are riding high.

Look, no wheels. Ford's engineering-research vp. Andrew A. Kucher unveiled a pet project late last month: a vehicle without undercarriage or suspension that glides, almost friction-free, on a film of compressed air (like air-supported parts of gyros). Kucher sees the Leva-Car sliding interurban passengers at 350 m.p.h.

The month in science

over rails, not roads. A turbojet would push it, also compress air to hold it up. So far, there's only a model.

How big is an inch? Well, which inch? Machine-tool makers, who care very much, are bedeviled by three kinds of inches (U.S., British and Canadian), all different (a political problem) and all distressingly fuzzy (a scientific problem). Help is in sight.

First: a sharper inch. Precision instruments are now demanding .00001-inch tolerances. That's for production *parts*. Production-line *gauges* need smaller tolerances, master gauges still smaller.

The machine-tool men would like master gauges good to .0000001 (that compares to human-hair thickness as a foot to a mile). National Bureau of Standards, which is Official Keeper of the Inch, can't deliver such accuracy yet. Reason: The master of all masters—the platinum-iridium meter bar locked in a vault in Paris—cannot be measured close enough.

What's needed is a new primary standard. NBS Director Allen V. Astin predicts international agreement (by 1960) on an atomic measuring stick: the wave length of orange light emitted by one particular kind of krypton atom (krypton is a gas used in "neon" signs). This is measurable to such accuracy that .0000001-inch master gauges could be made.

The political problem is tougher. The three inches differ by less than .00001 inch, yet that is enough to create trouble when instruments (or parts) made in different countries must be used together.

- ▶ Present British inch is 2.5399956 centimeters. But a proposed switch to a new official yard would make the inch exactly 2.54 cm.
- ▶ The Canadian inch is already 2.54 cm. Australia now has no legal standard but leans to the 2.54-cm. inch also.
- ▶ The U.S. inch is 2.540005 cm. (Oddly, it's not really official because Congress has never specified a legal standard inch.)

Machine-tool makers want the U.S. to adopt the 2.54-cm. inch, too. Not only would this put us in line with other English-speaking countries, but it would also make our machines usable with the metric system (a simple gear of 127 or 254 teeth converts measurements automatically).

Why not go ahead? Maps. The Coast & Geodetic Survey has laid out 150,000 markers by the present inch. A change would tangle boundaries across the country. That minute .000005-inch shift would be multiplied to shift some lines three or four feet.

Diplomatically, Dr. Astin last winter suggested a way out: international agreement—without specific legal blessing—on a yard that would give the 2.54-cm. inch. Map men could continue with their unofficially-official orphan inch, machine men would get their world-wide, easily converted inch. Everybody should win.

Walter Mann

HELP YOURSELF to a BETTER JOB!

I'LL TRAIN YOU AT HOME TO BE
A HIGHLY-PAID MECHANIC IN
**AIR CONDITIONING
AND REFRIGERATION**

R. C. ANDERSON
President
CTI

It has been one of America's great industries for years—but the way it's growing, you'd think it was in its infancy! That's why the air conditioning and refrigeration industry appeals so strongly to ambitious men who want better jobs, more security, higher pay.

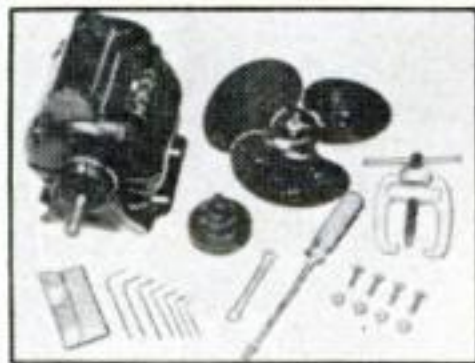
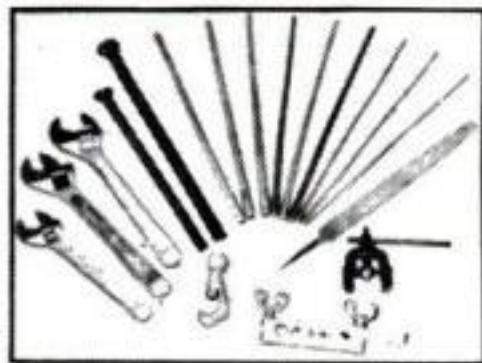
Over 150 million refrigerating units are in use today—are in need of repair and service. Each year, 3 million refrigerators, 1 million freezers and 2 million air conditioners are produced. Not only homes, but stores, offices, restaurants, motels and transportation systems use some form of refrigeration. Even autos are being made with air conditioners. No wonder trained men are in big demand—are so well paid! Want to be a mechanic in this field? To find out how, just mail coupon for valuable free information!

AN AMAZING, NEW SHOP-METHOD TRAINING PLAN

After years of research, CTI has developed a wonderfully effective training plan. It enables you to train at home in spare time. You get 23 big kits to build an air conditioner, refrigerator, freezer or milk cooler. You keep all this equipment. You do 10 service and trouble-shooting jobs. CTI brings field training right into your home! You get practical experience as you learn.

YOU GET EXPERIENCE AS YOU TRAIN BECAUSE YOU PRACTICE WITH COMMERCIAL EQUIPMENT

You get all parts and tools to build a heavy-duty, commercial-type, ¼ h.p. refrigeration high-side (illustrated at right.) You receive lesson material which not only makes kit assembly easy, but downright fascinating! Remember, kit training in this field is a CTI "FIRST"



Above left is photo of special tools in just one kit. In another kit (right) you get motor, fan, pulley, service tools. You get other tools, tubing, much equipment, all of finest quality. Kits are sent on a planned schedule so that you learn in easy stages. Kit training develops skill, provides experience, speeds training.



**OPEN A SHOP—
BE THE BOSS**

The air conditioning and refrigeration industry is a good one in which to start out "on your own." Many CTI graduates have done it, and if you have the determination, you could do it, too! CTI has special information for men who want to go into business. Mail coupon for details.

COMMERCIAL TRADES INSTITUTE
1400 Greenleaf Avenue • Chicago 26, Illinois

**MAIL
TODAY
FOR
FREE BOOK
AND
SAMPLE
LESSON**



**23
BIG KITS**
to build
**AIR CONDITIONER
REFRIGERATOR
FREEZER or
MILK COOLER**

HOW YOU MAY EARN CASH AS YOU TRAIN

Many students do repairing in their spare time soon after they enroll. A number get part-time jobs, others open shops. With their earnings many students not only pay their tuition, but sometimes have enough money remaining to put in the bank. The reason that students can do field work for profit is that CTI training is practical. Students get their experience as they train—not as low-paid apprentices! But get the complete story on your opportunities. Fill out and mail coupon today.

COMMERCIAL TRADES INSTITUTE

1400 GREENLEAF AVENUE
CHICAGO 26, ILLINOIS

DEPT. R-470

Tell me how I can qualify for a better job or a business of my own. Send booklet, Success in Air Conditioning & Refrigeration, and Lesson Sample. Both FREE.

Name _____ Age _____

Address _____

City _____ Zone _____ State _____



Keeping the Home Shipshape



STRIKE WOODEN MATCHES handily on a strip of sandpaper taped near the kitchen stove. Just fasten it in place with masking tape and it can be replaced easily with a new strip.



A WIRE TIE RACK from the dime store will keep an umbrella from slipping to the floor of a closet. Mount it so that it folds downward to hold the standing umbrella against the wall.



KITCHEN CHAIRS CAN'T SCRATCH paint, tile or wallpaper if you protect them with wall bumpers. With wooden chairs, insert rubber-headed tacks or toilet-seat bumpers in the back rests to

soften the jar when they are pushed against the wall. To cushion the back of a tubular metal chair, cement weatherstripping to the section that touches the wall.



VENETIAN-BLIND CORDS CONFUSE YOU? Wrap one cord on each blind with a bit of colored tape. Then a glance will tell you which cord to pull to tilt the slats the way you want them.



HIDING A KEY to the back door is easy. Cut a small slot in the frame of the screen door where it fits against the jamb. Drive in a finishing nail and hang the key in the slot.

To Introduce You to the New
RCA VICTOR POPULAR ALBUM CLUB

THESE FIVE OR **ANY FIVE** OF THE
24 ALBUMS LISTED BELOW FOR
ONLY \$3.98 [RETAIL VALUE AS HIGH AS \$24.90]

... if you agree to buy five albums from the Club during
the next twelve months from at least 65 made available

THIS exciting new plan, under the direction
of the Book-of-the-Month Club, enables you
to have on tap a variety of popular music for
family fun and happier parties . . . and at an
immense saving. Moreover, once and for all, it
takes bewilderment out of building such a well-
balanced collection. **You pay far less for albums
this way**—than if you buy them haphazardly.
For example, the extraordinary introductory
offer described above can represent as much as a
40% saving in your first year of membership.
Thereafter you save almost 33 1/3%. After buy-
ing the five albums called for in this offer, you
will receive a *free* 12-inch 33 1/3 R.P.M. album
with a retail price of at least \$3.98, for every two
albums purchased from the Club. **A wide choice
of RCA VICTOR albums** will be described each
month. One will be singled out as the *album-of-
the-month*. If you want it, you do nothing; it will
come to you automatically. If you prefer one of
the alternates—or *nothing at all in any month*—
you can make your wishes known on a simple
form always provided. You pay the nationally
advertised price—usually \$3.98, at times \$4.98
(plus a small mailing charge).

**SINGING STARS • BROADWAY MUSICALS • JAZZ
DANCE MUSIC • MOOD MUSIC • COLLECTORS' ITEMS**



ALL ALBUMS ARE
12-INCH, 33 1/3 R.P.M.
LONG-PLAYING



**CHECK THE FIVE ALBUMS YOU WANT.
DO NOT DETACH FROM THE COUPON.**

- | | |
|--|---|
| <input type="checkbox"/> WE GET LETTERSPerry Como | <input type="checkbox"/> PETER PAN.....Mary Martin |
| <input type="checkbox"/> BELAFONTE | <input type="checkbox"/> MUSIC FOR DINING
Melachrino Orchestra |
| <input type="checkbox"/> FRANKIE CARLE'S SWEETHEARTS | <input type="checkbox"/> BOUQUET OF BLUES...Dinah Shore |
| <input type="checkbox"/> NEW GLENN MILLER BAND IN HI FI | <input type="checkbox"/> SWEET 17.....Ames Bros. |
| <input type="checkbox"/> BRASS AND PERCUSSION
Morton Gould | <input type="checkbox"/> HEART OF HAVANA.....Art Aragon |
| <input type="checkbox"/> JAMAICA.....Lena Horne | <input type="checkbox"/> EYES OF LOVE ...Hugo Winterhalter |
| <input type="checkbox"/> STUDENT PRINCE.....Mario Lanza | <input type="checkbox"/> THINKING OF YOUEddie Fisher |
| <input type="checkbox"/> BING WITH A BEAT....Bing Crosby | <input type="checkbox"/> MOONGLOW.....Artie Shaw |
| <input type="checkbox"/> TOWN HALL CONCERT PLUS
Louis Armstrong | <input type="checkbox"/> INSPIRATIONAL SONGS
George Beverly Shea |
| <input type="checkbox"/> LET'S DANCE with the THREE SUNS | <input type="checkbox"/> ALL TIME FAVORITES
Eddy Arnold |
| <input type="checkbox"/> SHORTY ROGERS PLAYS
RICHARD RODGERS | <input type="checkbox"/> MAGOO IN HI-FI |
| <input type="checkbox"/> FAMILY ALL TOGETHER
Boston Pops | <input type="checkbox"/> BLUE STARRKay Starr |

RCA VICTOR POPULAR ALBUM CLUB P93-4

c/o Book-of-the-Month Club, Inc., 345 Hudson St., N. Y. 14, N. Y.
Please register me as a member of the RCA VICTOR Popular Album
Club and send me the five albums I have checked at left, for which
I will pay \$3.98, plus a small mailing charge. I agree to buy five
other albums offered by the Club within the next twelve months, for
each of which I will be billed at the nationally advertised price:
usually \$3.98, occasionally \$4.98 (plus mailing charge). Thereafter,
if I continue, for every two albums I buy I will be allowed to choose
a third album, *free*. After the first year, I need buy only four albums
in any twelve-month period to maintain membership.

Name _____

Address _____

City _____ Zone _____ State _____

NOTE: If you wish to enroll through an authorized RCA VICTOR dealer, fill in here:

Dealer's Name _____

Address _____

City _____ Zone _____ State _____

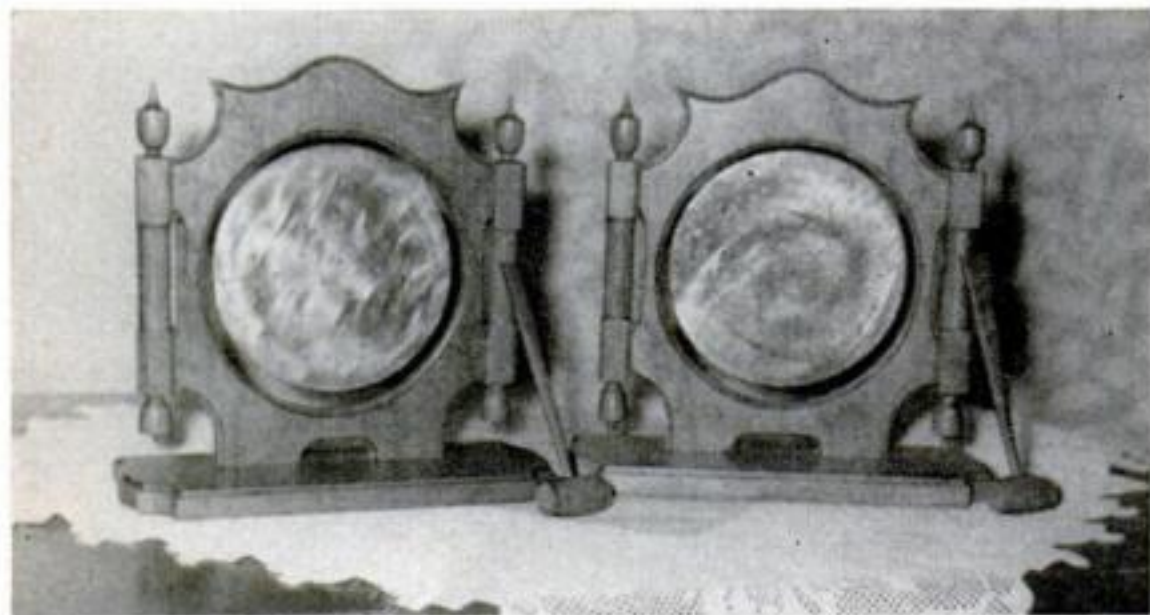
Send no money. A bill will be sent.

Prize Projects BY PS READERS



Walking-Tractor Conversion. When Al Haeberle of St. Peters, Mo., wearied of pounding the furrows behind his walking-model Gravely tractor, he added his own trailer to turn it into a riding job.

Al, who did all of the work except the welding, is mighty pleased with the little buggy. A 34" wheelbase lets it turn on a dime, and the Gravely power plant (engineered for both walking and riding tractors) handles the load easily.



Two-Tone Dinner Gong. Only the sounds are different when you strike the two brass disks of this mated dinner-gong set. Designed and made by Claire H. Andrews, a retired school superintendent in Marion, Iowa, the project displays fine wood- and metalwork.

The frames and cork-headed mallets were cut and turned from native cherry. Decorative hammering tensioned the disks to the desired resonances. They are suspended with nylon cords.



Playhouse in the Sky. It's been high life for seven-year-old Christine Neumann since her father, Alfred, built this aerial playhouse in the back yard of their Spring Lake, Mich., home. A swing set does double duty as part of the supporting framework for the house and sun porch. Canvas roof and hardboard walls are easily removed for winter storage and painting.

Have you recently completed a workshop project of which you are particularly proud? Send a good photograph of your work, along with the negative and a brief description,

to the Mechanics and Handicraft Editor, POPULAR SCIENCE, 353 Fourth Ave., New York 10, N. Y. We will pay \$15 for each item that is accepted for publication.

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Patent Attorneys

82-D DISTRICT NATIONAL BUILDING
WASHINGTON 5, D.C.

"I'd like to see them make..."



FOOD FREEZERS WITH FUR-COAT STORAGE SPACE. Add a compartment at the side of an upright freezer, or a narrow drawer below a cabinet freezer.—Alden Smith, Newark, N.J.



A POT-SCOURING ATTACHMENT for an electric mixer. A disk with clamps to grip a steel-wool pad would clean even a burned pot in a hurry.—Mrs. Lawrence Frey, Brookville, Ind.



A COLLAPSIBLE TOT-TOTER for youngsters too big for a stroller, but small enough to weary easily on shopping tours or trips to the zoo.—D. L. Westphal, Rochelle Park, N.J.

Everyone has his own pet idea of a gadget that he would like to see in general use. The five ideas illustrated above were suggested by POPULAR SCIENCE readers. What's



A STATION-WAGON GRILLE for use when the upper half of the tailgate is open. It would admit breezes yet keep youngsters or pets safely enclosed.—Mrs. L. L. Shook, Yorktown, Va.



A TRANSMISSION MINDER on the dash of an automatic-shift car to warn when transmission oil level is low. That fancy mechanism can cost plenty to fix.—J. M. Blasko, Savanna, Ill.

yours? We will pay \$5 for each one published. Please use Government postcards only. Write name and address clearly. Contributions cannot be acknowledged or returned.

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

PATENTS • COPYRIGHTS • PATENTS

142-L VICTOR BUILDING, WASHINGTON 1, D.C.



FOR WATERPROOF GLUING

Completely waterproof two-component resorcin resin glue forms a bond stronger than the wood itself. Resists continuous outdoor exposure, cold and boiling water, moist and dry heat, mold and fungus, solvents, acids and alkalis. Unbeatable for boats, outdoor furniture, sports equipment. Comes in 1/4 pint and pint cans.



FOR NO CLAMP GLUING

Regular or nonflammable cements that bond on contact. Strong, water-resistant and heat-resistant. Best you can use for plastic laminates, plywood wall panels, leather, linoleum, synthetic rubber, thin gauge metal and all dissimilar materials. Can sizes in pints and quarts.



FOR GENERAL WOOD GLUING

This powdered casein glue makes strong, water-resistant joints. Works fine on hard or soft woods and many other materials. Mixes easily in cold water and can be used anywhere, even in cold outdoor temperatures. Ideal for laminating beams . . . gluing tables and counter tops, sashes and doors, molding and fixtures. 1 and 5 pound can sizes.



Buy where you see
this emblem . . .



There's an Elmer's Glue for every job you do!



FOR HIGH SPEED GLUING

A modern, ready-to-use polyvinyl resin glue for general interior use. Perfect for gluing dowels, paneling, inlays, marquetry, cloth, paper and all porous materials. Fast setting, dries clear. Available in refillable plastic squeeze bottles, tubes and jars in a wide variety of sizes.



FOR STAINPROOF WOOD GLUING

Chemically neutral, this powdered urea resin glue does not stain acid woods like oak or mahogany. It is highly water resistant and mixes easily in cold water. The perfect glue for fine furniture panels, cabinet work, veneering . . . any job where a clean glue line is important. Available in 1 and 5 pound cans.

Borden Glues are available at hardware, variety, paint and lumber supply stores everywhere. For a free chart which shows the right glue to use for every job, print your name and address on a post card and mail to: Elmer's Glue Chart, The Borden Company, 350 Madison Avenue, New York 17, N. Y.

IF IT'S *Borden's* IT'S GOT TO BE GOOD!

You ought to know...

Now is still a good time to shop around. Prices seem to be leveling off. All five commodities in the Popular Science Price Report have held steady. Your local shopping center is a buyer's market. There are some good but not dirt-cheap bargains to be had.

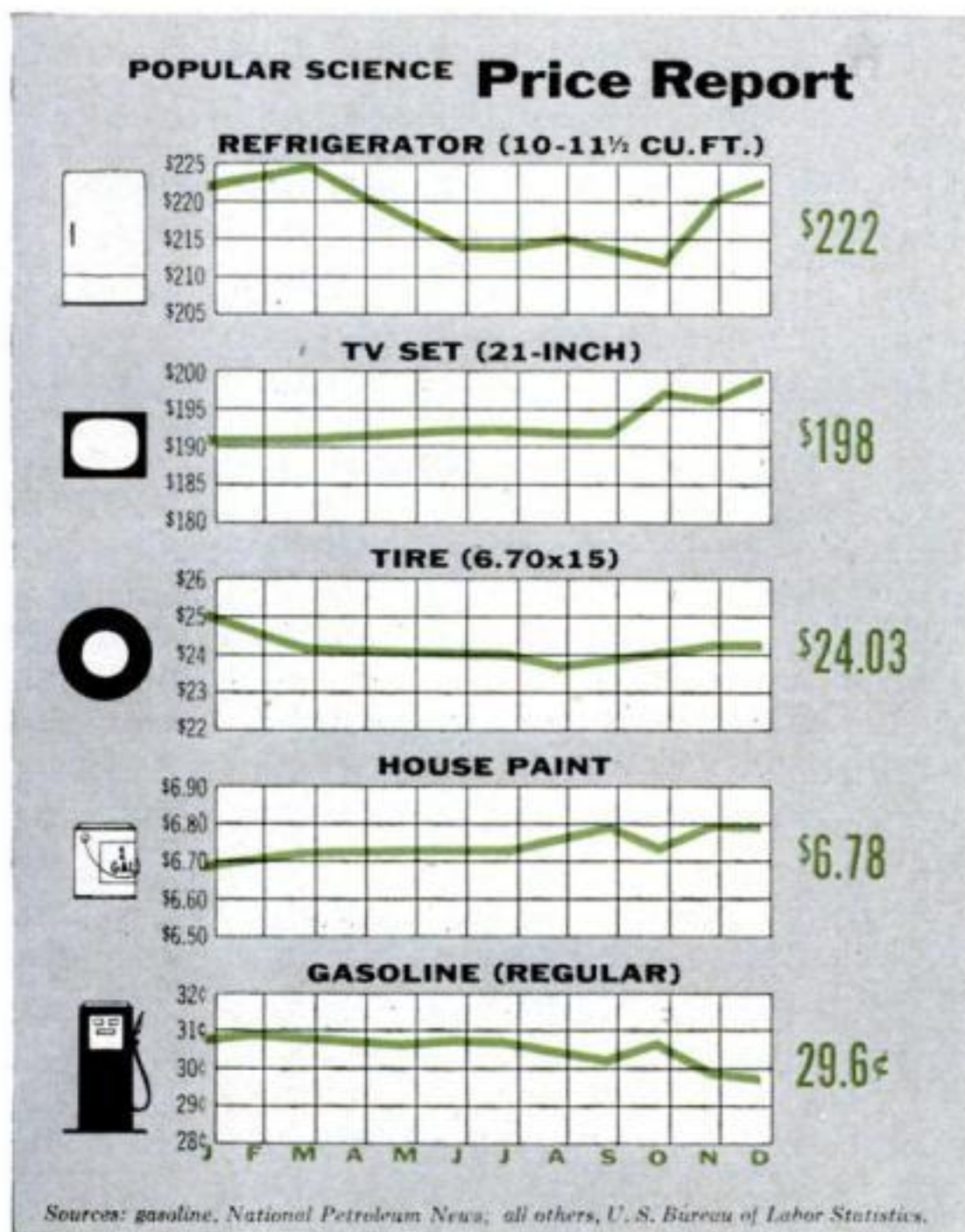
Closely related to the prices in the PS chart is the Consumer

Price Index, published by the Bureau of Labor Statistics and covering all the major items that go to make up your whole cost of living. Last December, the index made front-page news: For the second month running, it stayed unchanged after a steady climb up through the previous 16 months. It rose over 19 percent from its 1950 low, and leveled out to 121.6. You, as a consumer, kept the index from going higher. Actually, you made the news.

U.S. buyers got tough, and showed a resistance to the new car prices. They had jumped nearly 12 percent over the dealers' prices for the previous, old-model month.

You wouldn't buy. That forced dealers to cut their prices. The discounts they gave evened out to about 2.5 percent. It was enough to hold the index steady.

- ▶ These prices should go down: Clothing prices have slipped, starting the first of the year. And store owners may cut them more, to get their racks cleared for spring and summer apparel. Gasoline has slipped on the PS Price Report. The summer demand, though, can keep it from slipping more. Tires are a possible sleeper. Auto production is off, remember. So a build-up in tire inventories could push down prices. That last tank of fuel oil for your furnace may be a good buy. Demand, slower than expected last winter, left big inventories.
- ▶ These prices should hold steady: Exterior house paint has straightened out on the price curve. But it's sometimes touchy to seasonal demands. Buy before July at the latest. Now tha



You ought to know...

new models have lost their luster, refrigerator prices should settle down. There's a chance that they will even go into a slight slump this spring, repeating last year's downtrend.

- These prices will probably rise: Viewing a new television set will cost you more. Prices have climbed steadily. Day-to-day living costs more, too. A meat scarcity has caused higher prices. Farmers are holding stock back from market, building up their drought-ridden herds with the current surplus of feed.

The forecast is pretty clear: The grocer's bill will total a little more. The same holds for services: doctor's bill, garage mechanic's repairs. But most other prices will probably hold steady through summer.

Don't put off appliance purchases, house improvements or car fixings much beyond October 1. Signs point to a business pickup by then. And you can be sure that prices will not lag far behind.

Having trouble finding a good auto mechanic? It's no wonder.

A critical shortage of garagemen is a major problem today for car manufacturers as well as car owners. The assembly lines are turning out cars faster than trade schools can train mechanics to fix them. On top of that, school shop facilities can't always keep pace with the snowballing advances in car engineering. Complex equipment for class work is often costly and not adapted to classes fast enough.

Sixty-seven million cars, trucks and buses are now rolling over America's streets and highways. But there are only 775,000 mechanics to keep them going. That's a ratio of one mechanic for every 87 vehicles. (Has the garageman's job become depressionproof? The statistics make it look so.)

To hold at the present 1:87 ratio, the industry needs 40,000 new mechanics every year: half of that for normal year-to-year replacements, the other half for our climbing vehicle registrations. But here's the rub: Only a third that number of mechanics are getting out of school now. It's doubtful whether the supply will ever catch up with the demand for them.

Industry and education together are trying to narrow the gap. The Automobile Manufacturers Association and the American Vocational Association have begun a two-phased program that is designed to:

- Recruit more, capable students for instructors' training courses in auto mechanics. Scholarship funds are being set up for this at Wayne State University and the University of Illinois.
- Find out what it takes to make a good prospective auto mechanic. Said one Detroit expert: "Many students entering automotive programs are not really fitted for the trade, and stand little chance of success." Funds for researching the qualities and aptitudes of successful mechanics are going to the University of Michigan.

Title registered, contents copyrighted

Charles M. Garvey

Superior's New Model 70 UTILITY TESTER®

FOR REPAIRING ALL ELECTRICAL APPLIANCES MOTORS • AUTOMOBILES • TV TUBES



As an electrical trouble shooter the Model 70:

- Will test Toasters, Irons, Broilers, Heating Pads, Clocks, Fans, Vacuum Cleaners, Refrigerators, Lamps, Fluorescents, Switches, Thermostats, etc.
- Will test all TV tubes for open filaments, inter-element shorts, burned out tubes, etc.
- Measures A.C. and D.C. Voltages, A.C. and D.C. Current, Resistances, Leakage, etc.
- Will measure current consumption while the appliance under test is in operation.
- Incorporates a sensitive direct-reading resistance range which will measure all resistances commonly used in electrical appliances, motors, etc.
- Leakage detecting circuit will indicate continuity from zero ohms to 5 megohms (5,000,000 ohms).

As an Automotive Tester the Model 70 will test:

- Both 6 Volt and 12 Volt Storage Batteries • Generators • Starters • Distributors • Ignition Coils • Regulators • Relays • Circuit Breakers • Cigarette Lighters • Stop Lights • Condensers • Directional Signal Systems • All Lamps and Bulbs • Fuses • Heating Systems • Horns • Also will locate poor grounds, breaks in wiring, poor connections, etc.

IT'S SO EASY!!



With tester's cord in outlet, current consumption of appliance is read direct on meter when line cord is connected to receptacle on panel. This typical iron takes 7 amperes (Good).



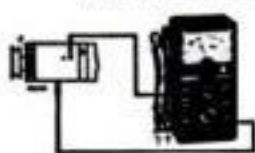
Small electric fan motor indicates 50 ohms (normal resistance).



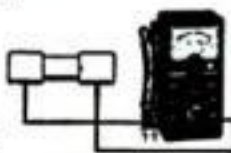
Control circuits of most furnaces use 24 volts obtained from step-down transformer. Here's how to check room thermostat to see if wires to it are live.



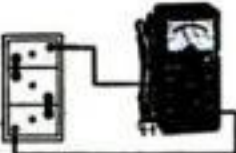
Manual supplied with Model 70 shows meter needle moves to right when test leads are connected to pins 3 and 4 of this 6AU6 tube. Procedure for testing all tubes used in TV are detailed in manual.



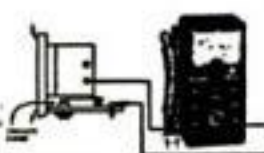
Test Generators



Test Auto Fuses



Test Storage Batteries



Test Circuit Breakers

READ THIS!

READ THIS!

READ THIS!

You don't pay for the Model 70 until AFTER you have examined it in the privacy of your home! Model 70 is

SHIPPED ON APPROVAL

NO MONEY WITH ORDER — NO C.O.D.

Try it for 10 days before you buy. If completely satisfied then send \$3.85 and pay balance at rate of \$4.00 per month for 3 months — No Interest or Finance Charges Added! If not completely satisfied, return to us, no explanation necessary.

MOSS ELECTRONIC DIST. CO.

Dept. D-450 3849 Tenth Ave., New York 34, N. Y.

Please rush me one Model 70. If satisfactory I agree to pay \$3.85 within 10 days and balance at rate of \$4 per month until total price of \$15.85 plus postage is paid. If not satisfactory, I may return for cancellation of account.

Name _____

Address _____

City _____ Zone _____ State _____



INCLUDED FREE!!

This 64-page book—practically a condensed course in electricity. Learn by doing.

Just read the following partial list of contents:

- What is electricity? • Simplified version of Ohms Law • What is wattage? • Simplified wattage charts • How to measure voltage, current, resistance and leakage • How to test all electrical appliances and motors using a simplified trouble-shooting technique.
- How to test all TV tubes; also simple procedure for determining which specific tube (or tubes) is causing the trouble.
- How to trace trouble in the electrical circuits and parts in automobiles and trucks.

Model 70 comes complete with above book and test leads. Only ...

\$15⁸⁵

YOU CAN SUCCEED IN BUSINESS THROUGH SPARE TIME HOME TRAINING

A better position—a higher salary—can be yours IF you can do the work. Business is always willing to pay the man who knows—and pay him well.

You don't have to be satisfied with a mediocre job at low pay when in your spare time at home you can quickly, and without interference with your present work, prepare for a brighter and happier future.

For nearly 50 years ambitious men and women have turned to LaSalle for greater ability and larger success. So decide today to take the first step to better your own future.

Check the career of your choice in the coupon below and we'll send you by return mail, without obligation, full information on that field—the opportunities, and what you must know to be successful.

You can win Success if you train for Success.

Mail the Coupon Today

LASALLE EXTENSION UNIVERSITY A Correspondence Institution

417 So. Dearborn St. Dept. 483R, Chicago 5, Ill.

Please send me, without obligation, full information on the field I have checked below:

- ☐ **LASALLE ACCOUNTING:** Training for position as Accountant, Auditor, Controller, Cost Accountant, Public Accountant, etc.
- ☐ **LAW:** Training in Law as a foundation for business or professional success. Degree of LL.B.
- ☐ **TRAFFIC & TRANSPORTATION:** Training for position as Motor Truck or Industrial Traffic Manager, Railroad; Rate Expert, Freight Solicitor, etc.
- ☐ **CPA TRAINING:** Advanced training in preparation for the Uniform CPA examination.
- ☐ **BUSINESS MANAGEMENT:** Training for Managerial, Sales and Department Executive positions.
- ☐ **STENOGRAPHIC-SECRETARIAL:** Training for position as Stenographer, Secretary or Executive Secretary using Gregg Shorthand System.

Name.....Age.....

Address.....

City, Zone & State.....

\$8 750 FIRST YEAR—IN YOUR OWN BUSINESS



Start Part Time—We Furnish Everything

We locally train you to run your own business, furnish all equipment and supplies to clean and moth-proof rugs and upholstery **on location** by world-wide process. No shop needed, you become quickly established. Just 2 average jobs a day bring \$8,750.00 NET profit in year. Employ others and **multiply** your earnings. As member of world's largest organization of its kind you are backed by National Advertising, receive 25 regular services to help build your business. You'll be only one in town whose process bears famous Parents' seal. Business grows rapidly due to recommendations and repeat jobs. **EASY TERMS.** Send **TODAY** for fascinating **FREE BOOKLET** with complete details.

DURACLEAN CO.

8-184 Duraclean Building • Deerfield, Illinois

LEARN AT HOME TO MOUNT BIRDS



Animals, Heads, Fishes, Pets; to TAN. Be a Taxidermist. Profit and FUN.

Hunters, save your valuable **TROPHIES**. Mount ducks, squirrels, everything. Learn to **TAN** for leather and furs. Wonderful **HOBBY** Have a **HOME MUSEUM**.—**BIG PROFITS** mounting for others. **INVESTIGATE NOW.**

FREE BOOK With 100 fine game pictures. **NOW absolutely FREE. Write TODAY.**

Send Postal **TODAY** for **FREE BOOK**. State **AGE**. **N.W. SCHOOL OF TAXIDERMY, Dept. 2604, Omaha, Neb.**



**FREE
COLOR
CATALOG**

TAFT KIT BOATS

17 models from \$42, frt. inc. World's finest boat kit line at mass production prices.



only \$399

FRT INC 18 FT

OFFSHORE CRUISER KIT

TAFT MARINE WOODCRAFT

Dept. PS-458 636-39th Ave. N.E., Minneapolis, Minn

ENGINEERING

**DEGREE IN
27 MONTHS**

B.S. DEGREE IN

AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHANICAL and ELECTRONIC ENGINEERING (Inc. Radio and TV)

Also B.S. DEGREE in 36 mo. in Mathematics, Chemistry, Physics (including Nuclear Physics). Engineering Science preparatory courses. Thorough, practical program. Individualized instruction emphasized. Government approved for G. I.'s

Keeping pace with progress in science and engineering

Spacious campus, 20 buildings; dormitories, gymnasium. Playing field. Modern, well-equipped laboratories including new physics lab and wind tunnel. Low tuition. New terms start quarterly. Enter June, September, December, March. Big demand for graduates. Students from 48 states and 40 foreign countries. Many earn a major part of their college expenses in this large industrial center. Send coupon for free catalog and full information. Enroll now!

INDIANA TECHNICAL COLLEGE

648 E. Washington Boulevard, Fort Wayne 2, Indiana

Please send me free information on 27 Mo. B.S. DEGREES in:

Aeronautical ☐ Chemical ☐ Civil ☐ Electrical ☐

Mechanical ☐ Electronics ☐

on 36 MONTH B.S. DEGREES in:

Mathematics ☐ Chemistry ☐ Physics ☐

Name.....

Address.....



RCA INSTITUTES offers you the finest of home study training. The equipment illustrated and text material you get with each course is yours to keep. Practical work with very first lesson. Courses for the beginner and the advanced student. Pay-as-you-learn. You need pay for only one study group at a time.

**Send for this
FREE Book Now** 

[RESIDENT SCHOOL courses in New York City offer comprehensive training in Television and Electronics. Day and evening classes start four times each year.
Detailed information on request. **]**

RCA INSTITUTES, Inc. Home Study Dept. PS-48
350 West Fourth Street, New York 14, N. Y.

Without obligation, send me FREE 52 page CATALOG on Home Study Courses in Radio, Television and Color TV. No salesman will call.

Name..... please print

Address.....

City.....Zone.....State.....

Korean Vets! Enter discharge date.....

In Canada — RCA Victor Co., Ltd.
5001 Cote de Liesse Rd., Montreal 9, Que.

To save time, paste coupon on postcard.

Inventors

If you consider your invention valuable, take these necessary preliminary steps promptly to protect it by applying for a United States patent.

Sketch and describe your invention. (For convenience in starting action on your invention, use "Evidence of Invention" form offered below.)

Sign, date and have this invention disclosure witnessed by two people capable of understanding your invention.

Have us make a preliminary search among U. S. patents already granted for similar types of invention.

We then prepare a report for you on the probable patentability of your invention and recommend your further course of action.

This firm is registered to practice before the U. S. Patent Office. We are available to assist you in the preparation and prosecution of your application for patent.

We shall be glad to send you promptly and without obligation, an instructive booklet—"Patent Protection for Inventors"—and our convenient "Evidence of Invention" form.

VICTOR J. EVANS & Co. *Merlin M. Evans*
REGISTERED PATENT ATTORNEY
440-D MERLIN BUILDING, WASHINGTON 6, D. C.

INVENTORS

PROTECT YOUR INVENTION BY A U. S. PATENT. SEND FOR FREE "INVENTION RECORD" FORM AND "PATENT INFORMATION EVERY INVENTOR SHOULD HAVE".

CARL MILLER
REGISTERED PATENT ATTORNEY

WOOLWORTH BLDG., 36th FLOOR, 48C
NEW YORK CITY



INVENTORS

U. S. Patents protect your inventions. Our free book of "Instructions on Patent Procedure for Inventors," also "Certificate of Invention" form sent without obligation.

C. A. SNOW & CO.

REGISTERED PATENT ATTORNEYS
426 SNOW BUILDING WASHINGTON 1, D. C.

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH

Registered Patent Attorney

805-Victor Building Washington 1, D. C.

INVENTORS

Send for
PATENT INFORMATION
Book and
INVENTOR'S RECORD
without obligation

GUSTAVE MILLER

48PS WARNER BUILDING
WASHINGTON 4, D.C.

REGISTERED PATENT
ATTORNEY

ASSOCIATE EXAMINER
U.S. PAT. OFF. 1922-1929

Patent Attorney & Advisor
U. S. NAVY DEPT. 1930-1947
PATENT LAWYER

INVENTIONS WANTED

If you want to market, or sell, your invention for cash or royalties, Write for our Free Booklet. Send no drawings. We also welcome hearing from firms, or private capital, wishing to review inventions in any field. We will be glad to send notice of our clients' inventions.

GLOBAL MARKETING SERVICE

2420 77th Ave. Dept. SD Oakland 5, Calif.

Make Tiny Genius Computers with the new and better

ELECTRIC BRAIN **BRAINIAC**® CONSTRUCTION KIT

You can make 106 computing, reasoning, arithmetical, cryptographic, logic, puzzle-solving, game-playing machines—all 33 GENIACS (1955) • 13 TYNIACS (1956) • 60 ALL NEW BRAINIACS (1957)—with our K15 instructive, scientific kit.

It's fun, easy-to-do and safe... includes everything needed—over 400 reusable solderless parts, full plans, diagrams, manual. These machines "think," compute, reason and display intelligent behavior... show you the magic of computer circuits... teach you to design your own circuits and machines.

BRAINIAC KIT K15: PRICE - Complete - \$17.95

(For shipment west of Miss. add 80c, if outside U.S. add \$1.80)

7-DAY FULL REFUND GUARANTEE IF NOT SATISFACTORY
ORDER YOUR BRAINIAC direct from the Originator & Manufacturer

BERKELEY ENTERPRISES, INC.

815 Washington St., R129, Newtonville 60, Mass.

WHAT ALL AUTO MECHANICS WANT TO KNOW



This Big Practical Book gives full information, with working diagrams, covering the principles, construction, ignition, service and repair of modern cars, trucks and buses.

Diesel Engines, Hydramatic and Fluid Drives Fully Explained.

A complete guide of 1696 Pages, with over 1500 Illustrations showing inside views of working parts, with instructions for service jobs. Completely up-to-the-minute! Priced at only \$6.



CIRCLE No. 1 IN COUPON

HOW TO FIX HOME APPLIANCES

REFRIGERATORS TOASTERS IRONERS VACUUMS
WASHERS DRYERS RANGES FREEZERS

Many other GAS AND ELECTRIC APPLIANCES

Handy Reference for Electric & Gas Servicemen, Mechanics, Dealers and Homeowners. Explains clearly and simply how to locate troubles, how to test, reassemble and connect. Wiring diagrams. 1000 Facts. Easy to read. Answers ALL your questions. 864 Pages. Illustrated. Only \$6.

CIRCLE No. 2 IN COUPON



TV TELLS HOW TO ANSWER RADIO RADIO T.V. QUESTIONS SERVICE LIBRARY

HERE IS LATE INFORMATION IN A HANDY FORM FOR RADIO AND TELEVISION REPAIRMEN, SERVICEMEN AND STUDENTS

TWO COMPLETE VOLUMES - 1568 Pages - 1085 Illustrations and Diagrams. 1001 Important Facts and Figures on Modern T.V., Radio, Electronic Devices. INCLUDES TRANSISTORS & Transistors Circuits, Rectifiers, Record Changers, P.A. Systems, Phonograph Pick-ups, F.M., Auto Radio, Short Wave,

Basic principles, Construction, Installation, Operation,



Repairs, Trouble Shooting. How to get Sharp, Clear T.V. Pictures. Install Aerials. How to Test. Explains COLOR SYSTEMS, Methods of Conversion, Terms, etc. Includes Ultra High Frequency. Quick ready reference or use as a home study course. Only \$8 for BOTH volumes.

CIRCLE No. 3 IN COUPON

KNOW YOUR TRUCK

The TRUCK & TRACTOR GUIDE for Mechanics & Drivers, Foremen, Garagemen, Helpers, Owners, Trouble Shooters, Farmers, etc. Covering Gas & Diesel Motor Principles - Construction - Operation - Maintenance - Repair - Brakes - Service of all Parts. 1376 Pages. FULLY ILLUSTRATED. Index. Only \$5.



CIRCLE No. 5 IN COUPON

PLUMBERS AND STEAMFITTERS GUIDES



Practical Trade Assistant & Reference Set. Explains in plain language and by clear illustrations, diagrams, charts, graphs and pictures the principles of modern plumbing practice including Pipe Fitting and Air Conditioning. 4 Vols. - 2624 Pages - 3642 Diagrams & Illustrations. Only \$8 for the complete set of 4 vols.

CIRCLE No. 6 IN COUPON

PAINTING & DECORATING MANUAL

Inside Trade information on outside and inside work, how to mix paints, preparation of surfaces, paper hanging, wood finishes, tools, synthetic paints, color (with color chart), spray equipment, costs, estimating, etc. A COMPLETE guide to easier, better painting and decorating. 464 Pages. Fully Illustrated. Only \$2.

CIRCLE No. 7 IN COUPON

7-DAY FREE EXAMINATION

SEND NO MONEY - Pay the postman nothing! We are glad to send you any of the Audel Guides for absolutely FREE examination in your own home. We take all the risks and leave all the decisions up to YOU. There is no obligation! If you decide to keep the books of your choice you may pay for them under our astounding easy-pay plan of only \$2 a month.

HERE IS ALL YOU DO

IT'S EASY TO ORDER: In the No-Risk Mail Order Coupon at the right just draw a circle around the number of Audel Guides you want us to send you for FREE EXAMINATION. We will send them to you at once to help you build a brighter future by increasing your SKILL. If for any reason at all you are not COMPLETELY satisfied, return the books to us, and that will end the matter! NO STRINGS OR CATCHES TO THIS OFFER.

THEO. AUDEL & CO.

49 West 23rd Street, New York 10, N.Y.

CARPENTERS AND BUILDERS GUIDES



PRACTICAL STOREHOUSE OF MODERN CONSTRUCTION INFORMATION (4 vol. set) for carpenters and all woodworkers. Explains in easy language and by profuse illustration principles, advances, short cuts, trade secrets, all based on the NEWEST information.

Vol. 1-Tools, steel square, saw filing, joinery, furniture, etc.; Vol. 2-Builders' mathematics, drawing plans, specifications, estimates, etc.; Vol. 3-House and roof framing, laying out, foundations, etc.; Vol. 4-Doors, windows, stair building, millwork, painting, etc. 4 vols. 1904 Pages. 3700 Illustrations. Whole set only \$8.

CIRCLE No. 8 IN COUPON

PRACTICAL ELECTRICITY

A COMPLETE HANDBOOK-Quick, simplified, ready reference. Complete instruction and practical information on the rules and laws of electricity-Maintenance of Machinery - A.C. and D.C. Motors - Armatures - Wiring Diagrams - House Lighting - Power Wiring - Meters - Batteries - Transformers-etc. Simple to understand. 1520 Pages. 2600 Illustrations. Priced at \$5.

CIRCLE No. 4 IN COUPON

DIESEL

ALL THERE IS TO KNOW ABOUT MODERN DIESEL ENGINES-Basic principles, starting valves, timing, fuel pumps, fuel injection compressor, air compressors, pistons, cylinders, lubrication, cooling systems, etc. Answers on operation, calculations. 640 Pages. Fully Illustrated. Priced \$3.

CIRCLE No. 9 IN COUPON

WELDERS GUIDE-Covers Electric, Oxy-acetylene, Thermit, Unionmelt welding for sheet metal, spot and pipe welds, pressure vessels and aluminum, copper, brass, bronze and other metals. Airplane work, surface hardening, hard facing, cutting, brazing, etc. 608 Pages. Fully Illustrated. Only \$3.

CIRCLE No. 10 IN COUPON

MATHEMATICS MADE EASY

A COMPLETE HOME STUDY COURSE-Starting with the first principles of arithmetic, advancing step by step through the various stages of mathematics, including the rules and calculations for mechanical and electrical problems. New EASY correct methods. Includes plane and solid geometry, trigonometry, algebra, calculus, etc. Practical tests, reference tables and data. How to use slide rule. 752 Pages. 550 Illustrations. Priced at only \$3.

CIRCLE No. 11 IN COUPON

NEW MACHINISTS AND TOOLMAKERS HANDBOOK

MODERN MACHINE SHOP PRACTICE-5 PRACTICAL BOOKS IN ONE. New from cover to cover. Tells how to set up and operate lathes, screw and milling machines, shapers, drill presses and all other machine tools. A COMPLETE INSTRUCTOR AND REFERENCE BOOK. 1728 Pages. Fully Illustrated. Priced at only \$6.

CIRCLE No. 12 IN COUPON

WIRING DIAGRAMS

This book gives the practical facts on wiring of electrical apparatus. It explains clearly and SIMPLY how to wire apparatus for all fields of electricity. Each diagram is complete and self-explaining. Know your HOOK-UPS! 304 Pages. Illustrated. Only \$2.

CIRCLE No. 13 IN COUPON

REFRIGERATION & AIR CONDITIONING

FOUR BOOKS IN ONE-basic principles, servicing, operation, repair of: 1. Household Refrigeration. 2. Special Refrigeration Units. 3. Commercial & Industrial Refrigeration. 4. Air Conditioning Systems. A GOLD MINE of essential information. Completely up-to-date. 1360 Pages. Fully Illustrated and Indexed. Priced at only \$6.

CIRCLE No. 14 IN COUPON

MAIL THIS NO-RISK COUPON TODAY!

THEO. AUDEL & CO. - Self Improvement Publishers Since 1879 -
49 W. 23rd Street, New York 10, N.Y.

Please mail me for 7 days' FREE EXAMINATION the books I have circled at right. I agree to mail \$2 in 7 days on each book or set ordered, and to further mail \$2 a month on each book or set ordered until I have paid the purchase price, plus shipping costs. If I am not completely satisfied with my Audel Guides I may return them.

NAME _____

ADDRESS _____

OCCUPATION _____

☐ SAVE SHIPPING COSTS! Check here if you enclose complete payment with order. We pay postage charges. You have same return privilege.

S-4 1 2 3 4 5 6

7 8 9 10 11

12 13 14 15 16

17 18 19 20 21

22 23 24 25 26

27 28 29 30 31

32 33 34 35 36

37 38 39 40 41

THE NEW ELECTRIC LIBRARY

A COMPLETE ENCYCLOPEDIA explaining in the simplest terms the fundamental principles, rules and applications of applied electricity.

A COMPLETE COLLEGE EDUCATION!

Fully illustrated with diagrams and sketches, calculations and tables for ready reference. Questions and answers. Trial tests for practice study and review. All based on the most modern theory.

Vol. 1-Principles and rules of electricity, magnetism, armatures, repairs. No. 15

Vol. 2-Dynamos, DC Motors, construction, installation, maintenance, etc. No. 16

Vol. 3-Testing instruments and tests, storage battery constr. and repairs. No. 17

Vol. 4-Alternating current, power factor, alternators, transformers. No. 18

Vol. 5-A.C. Motors, windings, maintenance, converters, switches, fuses, etc. No. 19

Vol. 6-Relays, condensers, regulators, rectifiers, meters, switchboards, etc. No. 20

Vol. 7-Wiring, house light and power, circuits, high

tension, plans, code, etc. No. 21

Vol. 8-Railways, signals, elevators, ignition, etc. No. 22

Vol. 9-Radio, telephone, telegraph, television, motion pictures. No. 23

Vol. 10-Refrigeration, illumination, welding, x-ray, electrical appliances, Index. No. 24

7,000 fully illustrated pages.

Priced at only \$20 for the ENTIRE SET. Also sold individually for \$2 each.



ALL TYPES OF BLUEPRINT READING

How to read scales, the standard symbols, detail and assembly prints, working drawings, short cuts, helps, hints and suggestions. THE MAN WHO CAN READ BLUEPRINTS IS IN LINE FOR A BETTER JOB. This book gives you the secret language, step by step in easy stages. 448 Pages. Very Fully Illustrated. Priced at \$3.

CIRCLE No. 25 IN COUPON

MASONS & BUILDERS GUIDES

A PRACTICAL ILLUSTRATED 4 VOL. SET-Explaining in clear, simple language and profuse illustration, principles, advances, short cuts, trade secrets, based on modern practice - including how to figure and calculate various jobs. Vol. 1-Brick work, bricklaying, bonding, designs. Vol. 2-Brick foundations, arches, tile setting, estimating. Vol. 3-Concrete mixing, placing forms, reinforced stucco. Vol. 4-Plastering, stone masonry, steel construction, blueprints. 4 Vols. 1440 Pages. 2067 Illustrations. Complete Set only \$8.

CIRCLE No. 26 IN COUPON

ELECTRIC MOTORS

THIS GUIDE covers the construction, hook-ups, control, maintenance and trouble shooting of all types of motors. Includes armature winding. Explains entire subject in great detail in simple language. Over 1056 Pages of information. 617 Diagrams. All types of motors fully illustrated and indexed for ready reference. Priced at only \$5.

CIRCLE No. 27 IN COUPON

OIL BURNERS

New, complete, explaining in detail both domestic and industrial oil burners. Includes electrical hook-ups and wiring diagrams. Fully covering the theory, construction, installation, operation, testing, servicing and repair of all equipment. Indexed for ready reference. Over 416 Pages. 320 Illustrations and Diagrams. Only \$2.

CIRCLE No. 28 IN COUPON

ADDITIONAL IMPORTANT TITLES

The following Audel Guides are all the best in their fields, written in clear simple fashion, all lavishly illustrated. Circle the numbers wanted in the MAIL ORDER COUPON below. All books are lent for FREE EXAMINATION.

- No. 29 SHEET METAL PATTERN LAYOUTS. 1152 Pages. \$7.50
- No. 30 SHEET METAL WORKERS HANDY BOOK. 448 Pages. 2.00
- No. 31 MECHANICAL DRAWING GUIDE. 192 Pages. 2.00
- No. 32 MECHANICAL DRAWING AND DESIGN. 480 Pages. 3.00
- No. 33 ELECTRONIC DEVICES. 304 Pages. 3.00
- No. 34 ELECTRICIANS EXAMINATIONS. 272 Pages. 2.00
- No. 35 ELECTRIC POWER CALCULATIONS. Page 480. 3.00
- No. 36 ELECTRIC DICTIONARY. 9000 Terms. 3.00
- No. 37 POWER PLANT ENGINEERS GUIDE. 1568 Pages. 5.00
- No. 38 ENGINEERS AND FIREMANS EXAMS. 544 Pages. 2.00
- No. 39 OPERATING ENGINEERS LIBRARY. 3 Book Set. 12.00
- No. 40 PUMPS, HYDRAULICS AND AIR COMPRESSORS. 1760 Pages. 6.00
- No. 41 HOUSE HEATING GUIDE. 1008 Pages. 5.00

2 YEARS OF STUDY can give you these ADVANTAGES

- Associate in Applied Science degree
- Preparation for a career as an engineering technician in

ELECTRONICS
ELECTRICAL POWER
METALLURGY
COMPUTERS
AIR CONDITIONING

- or you can continue without loss of credit to a 4-year Bachelor of Science degree in Mechanical or Electrical Engineering

at **MSOE**
in Milwaukee

THE
ENGINEERING
TECHNICIAN

FREE folder answers your questions about the Engineering Technician, who he is, what he does, and how to become one.

SEND TODAY

MILWAUKEE SCHOOL OF ENGINEERING

1025 N. Milwaukee St., Dept. PS-458 Milwaukee, Wisconsin
Please send free folder

- ☐ "The Engineering Technician;"
☐ Booklet "Your Career in Engineering."
(please print)

I'm interested in _____
(name of course)

Name _____ Age _____

Address _____

City _____ Zone _____ State _____

Eligible for vets. educational benefits ☐ yes ☐ no.

Discharge date _____

MS-85



C-10

**Beauty by
Colorcrete
Can Earn
High Incomes**



Beautifying buildings by Colorcrete is a business opportunity awaiting men of modest capital everywhere. Owners of homes, stores, motels, schools — almost any type of construction — are looking for means to give lifetime eye-appeal to drab or dirty concrete, stucco and similar masonry surfaces. Colorcretors can do such jobs, in little time and at little cost, and pocket generous profits. Colorcrete is a cementitious material, applied by air pressure. Tough, tenacious, enduring; 30 colors. Investigate this low-investment enterprise by writing for the Opportunity Book.

COLORCRETE INDUSTRIES, INC.
572 Ottawa Ave., Holland, Mich.

COLORCRETE

**WANT
MORE
MONEY?**
GET INTO
PHOTOGRAPHY

NEW YORK INSTITUTE OF PHOTOGRAPHY
Dept. 5 10 West 33 St., New York 1, N. Y.

HYPNOTISM
Be Popular Amaze Entertain

Learn to apply Hypnotism and Autosuggestion in short time by training at home. Write to America's oldest, most famous Hypnotic School for free information—now—today. **DON'T DELAY.** Satisfaction or money refunded. Sent in plain wrapper.

SCHOOL OF APPLIED HYPNOLOGY
Dept. 24 120 Central Park South N. Y. 19, N. Y.

Find HIDDEN TREASURES

GOLD, SILVER, PRECIOUS METALS with the Famous Model 27 Metal Detector. Lightweight, ultra-sensitive, low cost. None finer. Also GEIGER COUNTERS for uranium and the VIOLITE for tungsten. **INFORMATION FREE**

THE *Detectron* CORP.
5528 Vineland Ave., No. Hollywood, Calif.



FREE
THE HISTORY
OF THE COMPASS
SEND FOR YOUR COPY



**DESIGNED for
MODERN CARS!**

DINSMORE AUTO COMPASS

Your best friend in strange cities and rural areas. Dinsmore compasses show you the right way—the shortcuts. Eliminates guesswork. Beautiful new Travelite models in gold or silver only \$6.95. Other models \$5.45 and \$6.45.



DINSMORE INSTRUMENT COMPANY

Write for folder
1804 Kelso St.,
Flint 1, Mich.

ONLY COMPASS
APPROVED BY
AUTO MAKERS!

END CAR WAXING, WASHING, POLISHING FOREVER!

**Amazing Chemical Discovery Reported In America's
Leading Digest Magazine, G-L-I-D-E-S A 6-Month Shine
Onto Your Car . . . In Just Minutes!**

Not a liquid—not a paste—nothing to pour, nothing to spread or rub in. Here for the first time is a **ROLL-ON DRY-SHINE POLISHER** . . . a chemically treated unit that you simply glide over your car . . . it coats your car with a tough, invisible, super-gleaming finish . . . your car is shined and polished **INSTANTLY!** And since this built-in wonder chemical is 12 times harder than wax—since rain, snow, ice or even road tars can't mar its beauty—each single treatment lasts as much as 6 **FULL MONTHS!** *You shine your car just twice a year!*

No More Washing Either!

To clean this gleaming super-hard finish . . . simply dust it, nothing else! That's because dirt, grease and grime just can't penetrate it. They whisk off with the touch of a dust-rag. So you not only end monthly waxing and polishing . . . but end weekly washing, too!

Best of all, because this magic Roll-A-Shine invention cleans, shines and protects your car's finish all by itself . . . it pays for itself 10 times over in the money you save on car waxes and polishes alone!

How the Roll-on Shine Works

A few years back at the General Electric research laboratories, scientists came upon a strange white chemical. To their complete surprise these research scientists noticed that whatever metal surface this magic chemical touched automatically shined and glimmered.

Even more startling, when scientists packed this General Electric wonder-chemical into a roll-on applicator and smoothed it over a car . . . that car actually shined 5 times brighter than when it was waxed. And incredible as it may seem, *each single shine lasted up to 6 full months.*

Used by U. S. Army, Navy and Leading Car Companies

But to really prove their point these scientists invited the armed forces and some of the nation's leading car companies to test this brilliant new discovery. **AND WHAT RESULTS THEY GOT!**

From all over came reports of paint jobs lasting 3 years longer . . . of chrome becoming absolutely rust-proof . . . of cars being fully polished and protected in **JUST 5 MINUTES TIME!** Out went the old-fashioned paste and liquid waxes and polishes . . . and a new method of car-polishing was born — the new, easy-to-use **ROLL-A-SHINE** with its built-in 6-month shine!

Free-Trial Offer

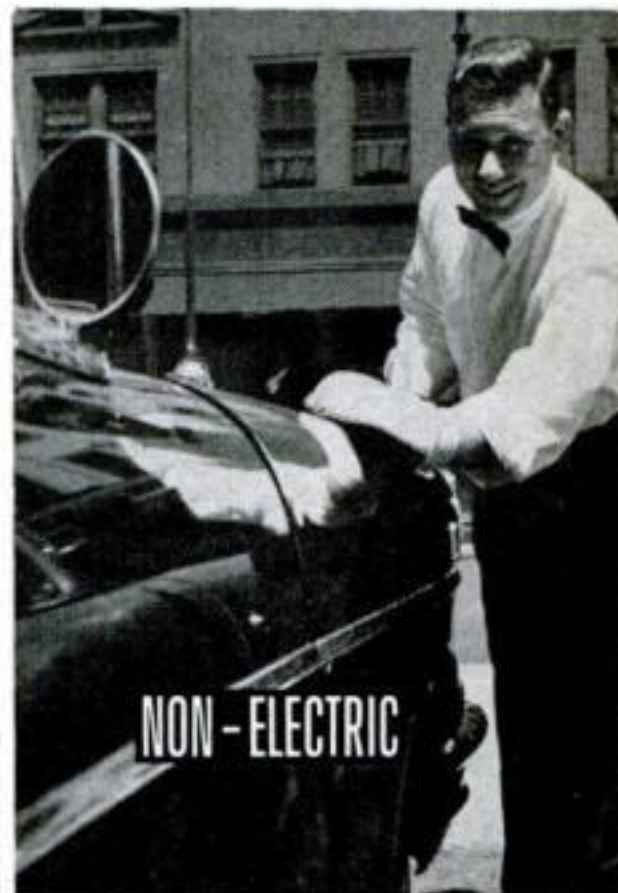
Now that you've read about the sensational new **ROLL-A-SHINE** you probably want to try its jet-action polishing on your

own car. Here's how, without risking a single penny.

Simply send the free-trial coupon below. When your **ROLL-A-SHINE** ARRIVES, just glide it over your car. Remember, it's completely flexible, so it's just as easy to get to little nooks and corners as it is to do the doors, fenders and roof. And also remember . . . there are no liquids to pour, no pastes to spread. Nothing else to buy or apply. You simply **g-l-i-d-e** **ROLL-A-SHINE** over your car . . . and that's all! And in just a few minutes your car doesn't gleam like new . . . if it isn't shinier and more lustrous than ever before . . . if it doesn't hold that rich bright shine for up to 6 full months . . . if you don't agree that you'll *never have to wax, polish or wash your car again* . . . then simply return your **ROLL-A-SHINE** . . . you have given your car a professional shine at our expense. That's how sure we are you'll be thrilled with this brilliant new invention.

Act Now! Start Saving Time, Work, Money Right Away

The price of a **ROLL-A-SHINE** complete with carrying case, is only \$2.98. Why you save double that figure in "car-wax money" the first few times you use it. And since **ROLL-A-SHINE** is guaranteed



Here's ROLL-A-SHINE in Action! Now clean and shine your car in just minutes . . . and keep that shine for 6 FULL MONTHS, thanks to amazing new ROLL-A-SHINE. NO MORE WASHING, EITHER. To clean, just dust it . . . no water needed! Completely safe for all finishes . . . Also makes chrome rust-proof.

to last 3 full years—you save at least \$25 to \$50 you'd ordinarily spend on waxes and polish.

However, due to the demands of service stations and car dealers, we have only a limited number of **ROLL-A-SHINES** available for public release. Therefore, all orders will be filled on a first-come, first-served basis. Once our supply is exhausted we will be forced to withdraw this offer. To take advantage of this free-trial opportunity, send the no risk coupon today!

Comstock Chemical Co., Dept. P
9 E. 45th St., New York 17, N. Y.

-----MAIL FREE-TRIAL COUPON TODAY-----

**Comstock Chemical Co., Dept. P
9 E. 45th St., New York 17, N. Y.**

Send me my **ROLL-A-SHINE** car polisher right away, with this understanding. If **ROLL-A-SHINE** does not do all you claim . . . if it doesn't save me time, work and money . . . if it doesn't end car waxing and polishing forever . . . then you will refund my money immediately.

☐ I enclose \$2.98 on money-back guarantee. (I save 56c in postage, handling and C.O.D. charges.)

☐ **SPECIAL OFFER:** Order Two Roll-A-Shines (one for myself, one for a friend) for Only \$4.98—Save \$1.00.

Name

Address

City State

☐ **C.O.D. ORDERS ACCEPTED:** Send **ROLL-A-SHINE** C.O.D. I will pay postman \$2.98 plus C.O.D. and postage. Same money-back guarantee of course.

OPTICAL BARGAINS



3" ASTRONOMICAL REFLECTING TELESCOPE (Famous Mt. Palomar type) See the Stars, Moon, Planets Close Up! 60 & 120 Power—An Unusual Buy!

Assembled and Ready to Use! You'll see the Rings of Saturn, the fascinating planet Mars, huge craters on the Moon. Aluminized and overcoated 3" diameter high-speed f/10 astronomical mirror. Telescope comes equipped with a 60X eyepiece and a mounted Barlow Lens, giving you 60 & 120 power. Optical Finder Telescope, included. Sturdy, hardwood, portable tripod. Free with scope: Valuable STAR CHART and 272 page "Astronomy Book." Stock No. 85,050-N.....\$29.50 f.o.b. Barrington, N. J. (Shipping wt. 10 lbs.)

Be Ready to See Rockets Land on the Moon! Order an EDMUND TELESCOPE Now!

4 1/4" ASTRONOMICAL TELESCOPE

Mt. Palomar type! Up to 270 Power. A fine Reflector Telescope complete with real Equatorial Mount and Tripod and 6X Finder. Aluminum tube, 4 1/4" dia. mirror, rack and pinion focusing eye-piece holder, 2 eyepieces and mounted Barlow Lens for 40X, 90X, 120X and 270X. Shipping weight approx. 25 lbs. Stock No. 85-006-N... complete, \$74.50 f.o.b. Barrington, N. J.



DIRECT MEASURING POCKET MICROSCOPE — 50 POWER

Fountain pen size, makes direct reading measurements; for checking small parts and dimensions under powerful magnification. Precision, glass etched reticle calibrated for measurements up to 1/10" by .001" divisions.

STOCK NO. 30,225-N...\$7.95 Pstpd.



New! 2 in 1 Combination! Pocket-Size

50 Power MICROSCOPE and 10 Power TELESCOPE
Useful Telescope and Microscope combined in one amazing, precision instrument. Imported! No larger than a fountain pen. Telescope is 10 Power. Microscope magnifies 50 Times. Sharp focus at any range. Handy for sports, looking at small objects, just plain snooping. Send Check or M.O. Satisfaction Guaranteed.
Order Stock No. 30,059-N.....\$4.50 Pstpd.



REAL 150 POWER ASTRONOMICAL TELESCOPE ONLY \$16.95 Postpaid

A good value at this Price though not the equal of our reflecting scopes above. Refractor type! Clear, razor-sharp viewing of stars, planets, craters on moon, etc. 32mm achromatic objective lens! First surface mirror diagonal (ends "stoop" viewing). Removable eyepiece—interchangeable. 50, 75, and 150 power! Tube length 27 1/2". Special attachment clamp for vibrationless viewing. Money back guarantee. Included free: 273 page "Handbook of the Heavens," Star Chart—and 16 page Star Booklet.

Stock No. 80,060-N.....\$16.95 Postpaid

Larger 42mm objective model—67, 100, 200 power—same features as above, with 38" tube length—(included free: "Handbook of the Heavens," Star Chart and 16 page Star Booklet).
Stock No. 80,061-N.....\$19.95 Postpaid



See The Satellites

NEW, LOW PRICE "SATELLITER" TELESCOPE

Get ready for a terrific sky show as more Satellites are vaulted into space. See thrilling sights with our amazing Satellite Scope at unheard of low cost. Also view comets—use as a Rich-field Scope for viewing star clusters. 5 power—wide 12° field. Use of high quality war surplus optics makes possible this bargain.

Stock No. 70,150-N.....\$9.95 Postpaid

We are the mfg. of the famous "Moonwatch" Satellite Telescope!



BUILD A SOLAR ENERGY FURNACE

A fascinating new field. Build your own Solar Furnace for experimentation—many practical uses. Easy! Inexpensive! We furnish instructions. This sun powered furnace will generate terrific heat—2000° to 3000°. Fuses enamel to metal. Sets paper aflame in seconds. Use our Fresnel Lens—14 3/4" diameter... f.l. 14".

Stock No. 70,130-N—package of 1 \$6.00 Pstpd.



INFRARED SNIPERSCOPE TELESCOPE & PARTS

See in the dark—without being observed. War surplus Sniperscope M-2. Gov't cost about \$1200. Instrument complete, ready to use. Includes Power Pack, infrared light source. Will operate from 6 V auto battery. Battery or transformer available.

Stock No. 85,053-N.....\$150.00 f.o.b.

Save still more money! Build your own Sniperscope! We will furnish instructions—parts, including: Power Packs, 1P25A image tubes, light units, filters, etc. For details—request FREE CATALOG "N"



WRITE FOR FREE CATALOG "N"!

Complete Line of Astronomical Telescope Parts and Assembled Telescopes. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories. Telescopes, microscopes, satellite telescopes, binoculars, etc. Request Catalog "N"!

ORDER BY STOCK NUMBER. SEND CHECK OR MONEY ORDER. SATISFACTION GUARANTEED!
EDMUND SCIENTIFIC CO., BARRINGTON, N. J.



unlimited opportunity for graduate engineers

Important firms visit campus regularly to interview seniors. Industrial growth... automation... technical advances create career opportunities for engineers, accountants, management experts. Share rewards awaiting college men... higher income... rapid advancement. Grasp your chance for a better life now! Start any quarter in this world-famed college. Approved for veterans.

Bachelor of Science degree in 27 months

In Mechanical, Civil, Electrical, Chemical, Aeronautical, Radio (TV-Electronics) Engineering. In 36 months a B.S. in Business Administration (General Business, Accounting, Motor Transport Management majors). Superior students may accelerate. 36-weeks course in Drafting. Intensive program: technical fundamentals stressed; comprehensive courses with more professional class hours. Small classes: personalized instruction. Enrollment limited. Beautiful campus. Well-equipped, new and modernized buildings and laboratories. Enter June, Sept., Jan., Mar. Earnest, capable students (whose time and budget require accelerated courses and modest costs) are invited to write Jean McCarthy, Director of Admissions, for catalog and book "Your Career in Engineering and Commerce."



TRI-STATE COLLEGE

548 College Avenue Angola, Indiana

LEARN PLASTICS



COMPLETE LOW COST SHOP METHOD HOME TRAINING NOW AVAILABLE

Get in on Big Money opportunities in Plastic molding, casting, forming, carving, etc. Earn as you learn with Interstate's professionally prepared course. All plastic materials furnished.

WRITE FOR
FREE
BOOKLET

INTERSTATE TRAINING SERVICE

DEPT. C-2, PORTLAND 13, OREGON



SPUTNIK Stamp - Free!

PLUS MANY OTHERS —Big, Exciting, Historic Earth-Satellite Issue Complete included in German Set Collection! New Multi-Colored Cpl. Set showing Revolution, Schumann-Schubert Music Error, Plants & Flowers Issue, Cycle Races, Nazi Airplane, etc. All this is yours FREE, to introduce our Bargain approval offers. EXTRA: 48 Page Stamp Dictionary also included. Send 10c to cover mailing costs.

STAMPEX CO. Box 47-SP White Plains, N. Y.

EARN
WHILE
YOU
LEARN
SEND
FOR FREE
BOOKLET



Be a LOCKSMITH

Learn fascinating, profitable trade from experts in spare time at home! Age no disadvantage. Year 'round, steady income. Full or part time. Practical, illustrated lessons. Make money even while learning! All materials and special tools supplied.

Locksmithing Institute, Dept. PS-100
150 Park Avenue E. Rutherford, N. J.

Lic. by N. J. State Board of Ed. Apprvd. for Vets



NUTRIA... NEWEST OPPORTUNITY

New fur-bearing animal now being bred in U.S.

Offers huge profits to breeders. This fur is next to Mink NOW in price and will soon surpass it. 15 to 20 young per year. Most easily and economically raised animal known. 1 1/2¢ per day to feed, ANY CLIMATE, disease resistant. The Cabana Marrone strain is obtainable ONLY through Cabana Nutria, Inc. and its authorized dealers and distributors. For free booklet and address of Cabana ranch nearest you write:

CABANA NUTRIA, INC. Dept. 27
636 West Lemon Avenue, Arcadia, California



EARN \$100 A WEEK AND UP

BE AN AUTO-DIESEL MECHANIC...EARN WHILE YOU LEARN

Many of our graduates earn \$100 a week and up. You learn fast in our school and shops because you learn with tools on real equipment. Experienced instructors explain WHY and show you HOW, then you DO IT YOURSELF. One of the best equipped technical schools in the United States. Thirty-nine years' experience training men. Successful graduates in 48 states and many foreign countries. Approved for veterans. Day and evening classes. Free bulletin—write today.

NASHVILLE AUTO-DIESEL COLLEGE
226 7th Ave. N., Dept. 42 Nashville, Tenn.

Better Than
Your Own

SHOE STORE AT HOME



Two-
Eyelet
Hit With
Cushioned
Comfort

No investment, no experience needed. Just show magic cushion comfort to friends, neighbors, co-workers. Advance commissions to \$4.00 a pair, plus Cash Bonus, Paid Vacation, \$25.00 Reward Offer. Outstanding values for men, women, children. Money back guarantee. Shoe samples supplied without cost. Write TODAY for FREE new 84 page catalog and full details.

TANNERS SHOE CO., 681 BROCKTON, MASS.

Are Those Crusts and Scales PSORIASIS?



If they are, use Siroil. For 25 years psoriasis sufferers have learned that Siroil tends to remove those unsightly crusts and scales. If lesions recur, light applications of Siroil help control them. Siroil won't stain clothing or bed linens. Offered on 2-weeks-satisfaction-or-money-refunded basis.

Write for **NEW FREE BOOKLET**
written by **REGISTERED PHYSICIAN**

NEW BOOKLET
answers 30
most-asked questions
about psoriasis.

SIROIL

AT ALL DRUG STORES

SIROIL LABORATORIES, INC.
Dept. PO-12 Santa Monica, Calif.

Please send me your new **FREE** booklet on PSORIASIS.

NAME _____ Please Print
ADDRESS _____
CITY _____ STATE _____

These men are getting
practical training in..

ELECTRICITY



ELECTRONICS ON REAL

A.C. and D.C. Motors
Generators
Switchboards
Controllers
Appliances
Electronic Units

TELEVISION



COLOR-TV ON REAL

Television
Receivers
Including Color TV
AM and FM Radios
Auto Radios
Test Equipment

Train in Great Shops of

COYNE

in Chicago - Prepare for a better job and a real future in **TOP OPPORTUNITY FIELDS**. Train on real full-size equipment at **COYNE** where thousands of successful men have trained for nearly 60 years - *largest, oldest, best equipped school of its kind* - est. 1899. Trained instructors show you how, then do practical jobs yourself. No previous experience or advanced education needed. Employment Service to Graduates.

START NOW—PAY LATER - Liberal Finance and Payment Plans. Pay most of tuition later. Part-time employment help for students. Frequent starting dates. **GET FREE BOOK**—"Guide to Careers in **ELECTRICITY-ELECTRONICS** and **TELEVISION-RADIO**"—no obligation; no salesman will call. Vets and Non-Vets get vital facts now.

B. W. COOKE JR., Pres. **COYNE** FOUNDED 1899
ELECTRICAL SCHOOL

Chartered Not For Profit

500 So. Paulina Street Chicago 12, Dept. 48-4C

MAIL COUPON TODAY

COYNE ELECTRICAL SCHOOL Dept. 48-4C
500 S. Paulina St., Chicago 12, Ill.

Send **BIG FREE** book and details of your training offer by return mail. I am interested in:

☐ Electricity-Electronics ☐ Television-Radio

Name _____

Address _____

City _____ State _____

not everyone does as well, but E. O. Lockin, who started a business of his own, reports...

for 12 months I've averaged
\$800 PER MONTH
INCOME—
most of it clear profit for me!

• Mr. Lockin expresses his grateful thanks for the opportunity to make a decent living on his own. Many men have discovered how to be independent, to be free of bosses and layoffs. L. A. Eagles grossed more than \$200 his first week. R. E. Traynor says, "I made \$62 gross in one day." Others report gross up to \$12,000 per year.

How much you make depends largely on you. You need no special skill, no large investment. Can start part time until you have full time.

No shop necessary

Our *Electric Rug Washer* cleans rugs, carpets right on floor... helps to show their natural color and beauty. So efficient and safe, used by largest hotels and railroads:

You take no risk. Machines fully guaranteed. Mail coupon today for complete information including how to start making big profits in *your own business*.

VON SCHRADER MFG. CO.
RACINE, WISCONSIN

You, too, can start your own business. No special skill, no large investment required. Mail coupon today for interesting FREE book.

VON SCHRADER MFG. CO.,
411 "R" PL., Racine, Wisconsin

Send at once (no obligation) your **FREE** booklet containing information about your *Electric Rug Washer* and how I can start *my own* permanent, profitable business.

Name.....

Address.....

City.....Zone.....State.....

BE A CLAIM INVESTIGATOR

INVESTIGATE ACCIDENTS!

Many earning \$750 to \$1000 a month. Thousands of insurance companies, steamship lines and Government Offices need Claim Investigators. Also big opportunities for your own spare time business. We train you at home. National Placement Service **FREE** of extra charge. Bill King writes: "Your course has paid off for me with large earnings. You can quote me — your Adjuster Training Course is worth many times the cost." Write **TODAY** for **FREE** book.

UNIVERSAL SCHOOLS

University Park, Dept. PS-4, Box 8202, Dallas 5, Texas



READY CUT HOMES

\$2150 AND UP DIRECT FROM MILL

YOU SAVE the items which help make today's building cost expensive: high labor cost, contractor's profit and overhead, insurance, architect's fees. Cut-to-Fit eliminates usual lumber and material waste, also costly mistakes. Anyone can assemble. Simple, easy-to-follow plans furnished and each part numbered. Complete with all lumber, roofing, nails, glass, hardware, paint, doors, windows. Freight paid. Low-cost building plans sold separately if desired. 57 Homes and Floor Plans.



5 EASY PAY PLANS
COLOR CATALOG

Send
25c



INTERNATIONAL MILL & TIMBER CO.
 Dept. PS-48 Bay City, Mich.



Print Your Own

Cards, Stationery, Advertising, Circulars, labels, photo and movie titles, church work, tags, etc. Save money. Sold direct from factory only. Raised printing like engraving, too.

Own a Printing Business

Print for Others, Good Profit. Have home shop. Junior press \$15; Senior \$29 up. We supply everything. Easy rules. Pays for self in short time. Write for free catalog of outfits and all details.

KELSEY PRESSES, C-33 Meriden, Conn.

Every Mason Wants



Masonic books for Blue Lodge Chapter, Commandery, Scottish Rite and Shrine.

Our Rituals Are Used the World Over

Send for free catalog for Masons, Odd Fellows, Knights of Pythias, Knights of Columbus, etc.

EZRA A. COOK PUBLICATIONS, INC.

P. O. Box 796 40D Chicago 90, Ill.

Secrets of VENTRILOQUISM Now Revealed!



Easy to learn in 60 to 90 days with our Home Study Course. **RESULTS GUARANTEED.** Make Money! Be Popular! Have Fun! Big Opportunity! Radio, Television, Stage Appearances! For Free Information regarding price and terms, **WRITE.** You must state your age. Dummy Catalog 25c.

MAHER HOME COURSE OF VENTRILOQUISM
 Box 36, Studio PS-4, Kensington Station
 Detroit 24, Michigan

MODERN
 TRANSPARENT
 ROOF



Plates
 Repaired
 \$5.00

Genuine Dupont Plastic NEW FALSE PLATE

From Your Old, Loose Plate. **NO IMPRESSIONS NEEDED.** New, revolutionary Duplication System actually transforms your old, loose, cracked, chipped plate into a new, natural-pink Dupont Plastic Plate with same teeth or new, natural matched teeth. **ONE DAY SERVICE!**

Only
\$18.95

SEND NO MONEY—Just your name and address for **FREE** details. Save at our low price. Highest prices paid for Dental Gold.

FREE: 6 months' supply False Plate Cleaner to all who write for our money saving offer.

ALL STATE DENTAL LABORATORIES

22 W. Madison Dept. 240 Chicago 2

**30-DAY
 MONEY
 BACK
 TRIAL**

Buy and Hold U. S. Savings Bonds

NEW ARMY MINE DETECTOR

Model SCR625. A portable device for detecting metallic and nonmetallic objects. Find buried pipe lines, cables, wires, hidden jewelry, coins, sewer tile, etc.

Send for circular.

Shipping weight
appr. 85 lbs. F.O.B.

N. Y. No
C.O.D.'s.

Send
order
to:

COLUMBO TRADING CO., INC.
395 Canal St., Dept. P.S., New York 13, N. Y.



MONEY for MEN

ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands, Art Goods and Novelties in Plastex and Marble Imitation. Experience unnecessary. 1/2c material makes regular 10c store sellers. Rubber moulds furnished for speed production. Small investment brings good returns. We are now placing big chain store orders with manufacturers. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 56, N.Y.

SHORTHAND

Famous SPEEDWRITING shorthand. 120 words per minute. No symbols: no machines: uses ABC's. Easiest to learn, write and transcribe. Low cost. 350,000 graduates. For business and Civil Service. Typing available. 35th Year. Schools in over 400 cities. Write for FREE booklet to!

Speedwriting

Dept. 2604-8
55 W. 42 St., N.Y. 36, N.Y.

IN

6

WEEKS

REAL ESTATE

BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! Graduates report making substantial incomes. Start and run your own business quickly. Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. **STUDY AT HOME** or in classrooms in leading cities. Diploma awarded. Write TODAY for free book! No obligation.

Approved for World War II and Korean Veterans

WEAVER SCHOOL OF REAL ESTATE (Est. 1936)
20205 Grand Ave.
Kansas City, Mo.

HANDS TIED?

—because you lack a
HIGH SCHOOL DIPLOMA

Many Finish in Spare Time at Home

If you did not finish high school, here is your opportunity. Go as fast as your time and abilities permit. Course equivalent to resident school work. Prepares for college exams. Standard texts supplied. Single subjects if desired. Diploma awarded. Write now for FREE 61st Year Booklet. Get important facts at once.

American School, Dept. H446, Drexel at 58th, Chicago 37

APRIL 1958 37

MAKE MORE MONEY

these two **FREE**
books will tell you how
SEND COUPON TODAY

TELEVISION

19 KITS OF EQUIPMENT, YOURS TO KEEP

ELECTRONICS & RADIO

NATIONAL SCHOOLS of Los Angeles, a leader since 1905, brings its famous training shop methods right into your home, in your spare time — gives you everything you need to make more money in a top-pay job. Course covers all phases of the industry including Color TV, Automation, AM-FM Radio, Hi-Fidelity, F.C.C. License. Many of our students open up their own TV-Radio repair shops. Easy to understand lessons, diagrams, manuals. Friendly personal guidance. Free graduate employment service. Low Tuition; earn as you learn.

AUTO MECHANICS & DIESEL

You are needed in auto garages, airplane factories, farm shops, experimental and government labs, wherever cars, engines, and trucks are repaired and serviced. National Schools Shop Method Training prepares you, in your own home, in your spare time for these fascinating opportunities. You get everything you need, including lessons, diagrams, manuals, consultation privileges, graduate employment service. Low tuition; pay as you learn.

YOU GET AND KEEP ALL THIS EQUIPMENT

Complete set of professional tools and tool box.

"Motor Analyzing Set" plus case and instructions.

Professional Socket Wrench Set for all Engines.

NATIONAL SCHOOLS
Los Angeles 37, California

MEMBER

NATIONAL SCHOOLS
TECHNICAL TRADE TRAINING SINCE 1905
LOS ANGELES 37, CALIFORNIA

SEND COUPON TODAY!

No salesman will call!

RESIDENT TRAINING ALSO AVAILABLE AT LOS ANGELES IN THESE 2 GREAT COURSES

If you wish to take your training in our famous Resident School Shops and Labs at Los Angeles, write for special Resident School folder

NATIONAL SCHOOLS, DEPT. C-48
4000 S. Figueroa St., Los Angeles 37, Calif.

Please rush **FREE** Book and Sample Lesson checked below. No obligation, no salesman will call.

☐ "My Future in TV-Radio-Electronics"

☐ "My Future in Auto-Mechanics and Diesel"

Name _____ Age _____

Address _____

City _____ Zone _____ State _____

☐ Check here if interested **ONLY** in Resident Training at Los Angeles.

VETERANS: Give date of discharge _____

DRAFTSMEN



**CASH BIG
PAY CHECKS!**

Train Now for
more success,
greater security

**LEARN AT HOME IN SPARE TIME
(or at college in Chicago)**

Check the want ads in any newspaper—SEE the big-pay opportunities open to you as a draftsman. What's more, you can learn this well-paid, prestige profession at home—quickly, easily! No special talent needed! Get complete, step-by-step Chicago Tech lessons in the mail, spend a few pleasant hours studying each week. In a short time you'll be a well-trained draftsman, ready to take your pick of many good jobs. Act now!



FREE INFORMATION—MAIL COUPON TODAY!
Get **FREE TRIAL LESSON** plus information about C.T.C. practical training. Learn what successful Chicago Tech graduates say about high pay and opportunities in drafting. No charge, or obligation.

CHICAGO TECHNICAL COLLEGE

D-226 Tech Bldg., 2000 So. Michigan Ave.
Chicago 16, Illinois
Mail me **FREE Lesson** with information about big opportunities in **DRAFTING**.

Name Age
Address
City Zone State

GENUINE 360 POWER 3" REFLECTING TELESCOPE

COMPLETE WITH
50X, 120X, 150X, 360X
magnifications, 4X finder scope,
folding tripod, plus "Handbook
of Heavens" & Magic Star Finder



Only
\$26⁹⁵

Never before a precision reflecting telescope sold with all these features, for anywhere near this low price. Professional observations guaranteed with this powerful astronomical telescope. Equipped with special WIDE-ANGLE lens for observing satellites, stars, nebulae, comets, Saturn's rings, Jupiter, Mars, Moon's detail, other celestial phenomena with observatory clearness, amazing closeups guaranteed on all objects. Will "split" close double stars. Acclaimed by experts. Optically & scientifically correct, for serious astronomical work. Comes completely assembled ready to use. Eyepieces give full range of powers, 50X, 120X, 150X, 360X. 3 inch f12.5 mirror aluminized & overcoated, guaranteed to resolve to Dawes limit. Special ventilated aluminum mirror housing for use in all climates. 3 foot hardwood folding tripod. Equatorial, altazimuth mount. Aluminum head compensates for earth's rotation & permits automatic tracking of astronomical objects. 36" Bakelite phenolic tube. 4X finder scope sights targets fast. Completely portable; scope instantly removable from tripod for easy storage & carrying to remote areas. Also included with this amazing precision instrument, 270 page book "Handbook of the Heavens", Magic Star Finder. Satisfaction completely guaranteed or money refunded. Sent complete, nothing else to buy at the amazing low price of only \$26.95. Send cash, check, or money order. Shipped by express F.O.B. Shipping weight 10 lbs.

Dept. DPS4, OPTIK INSTRUMENTS CO., 509 Fifth Ave., NY 17, N.Y.



NEW CHROME-PLATED .22 CAL. DOUBLE DERRINGER

Imported from Europe. It is an EXACT copy of famous Remington Derringer popular in the late 1800's. Valuable collectors item. Fine "Old World" gun craftsmanship has been employed to give you a superior handgun and still retain all the excellent features of the original Derringer. Accurate! It is terrific for plinking or as a close-in defensive weapon. Shoots .22 short, long or long rifle ammo. Richly chrome-plated with checkered black grips. Send cash, check or M.O. Shipped F.O.B. Los Angeles, Calif. resid. add 4% state tax. Guaranteed satisfaction. Only \$24.95. **SEAPORT TRADERS, INC.**, 409 E. 12th St., Dept. 115, Los Angeles 15, Calif.

(Advertisement)

on any object ELECTROPLATE
ANY OBJECT IN HOME, SHOP, GARAGE—
NOW with our NEW **ELECTROCHEMICAL** Outfit. You can easily do your own plating. Not a paint. But a hard durable metal plate, equal to commercial plating. Get your own plating kit with instructions on plating metals and non-metal objects as Tools, Auto Parts, Silverware, Jewelry, Baby Shoes and 1001 other articles with **Chrome, Nickel, Copper, Gold, etc. SEND NO MONEY.** Everything sent C. O. D. for the low price of ONLY \$5.95 or send \$5.95 now and receive it postpaid. Money back in 7 days if not satisfied. **M. Z. SALES CO.**, Dept. H-17, 113 West 42nd St., New York 36, N. Y.

FIX OUTBOARD MOTORS

POWERMOWERS, AND ALL SMALL 2 & 4-CYCLE GASOLINE ENGINES

MAKE EXTRA MONEY— or, repair your own equipment and **SAVE!** Fully illustrated, easy-to-understand, Home Study Course. Write today for **FREE** information.

LINCOLN TECHNICAL INSTITUTE
SUITE 4-G 472 MARKET STREET, NEWARK 5, N. J.

make your own Gems 36⁵⁰
The Gem Maker comes complete with all necessary equipment, including a super-charged diamond blade for sawing, and all the wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt for only \$36.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.
B&I MANUFACTURING CO.
Dept. S, Burlington, Wis.

GET INTO RADIO-TELEVISION

Prepare for Big Pay Jobs or Your Own Business
—**TRAIN AT HOME IN SPARE TIME!**
Earn While You Learn

Good pay jobs are waiting for men who know **RADIO-TELEVISION**. Learn at home, get valuable, interesting, actual, practical experience with kits and equipment we send. Earn extra cash servicing sets while learning. No previous experience needed. Rush coupon for big book and Sample Lesson... **FREE!** No salesman will call. Our 27th year.

FREE!
60 Page
Catalog
and
Sample
Lesson

Sprayberry Academy of Radio-Television
1512 Jarvis Ave., Dept. 55-F, Chicago 26, Ill.
Rush catalog and complete lesson... no obligation.

NAME.....
ADDRESS.....
TOWN..... STATE.....

16 ways to make STEADY MONEY

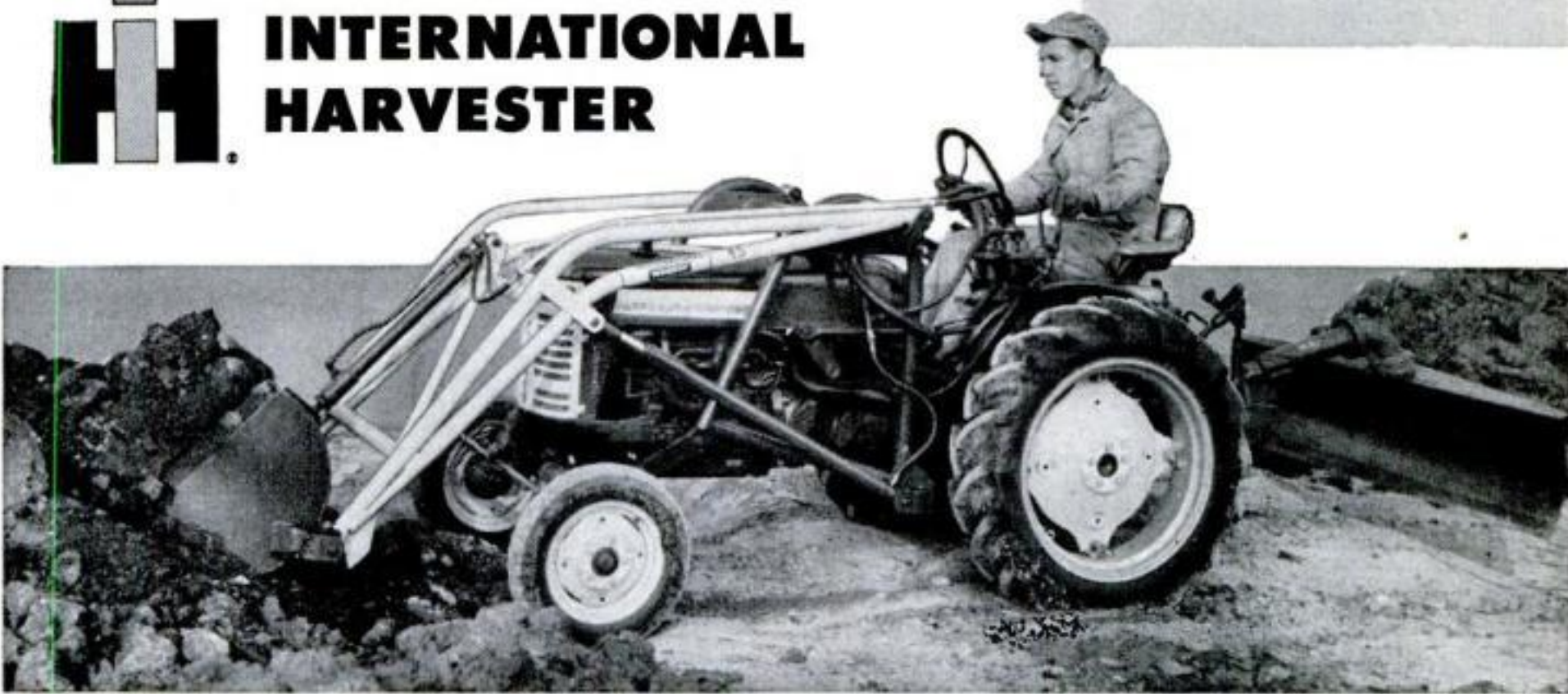
with an International Cub® Lo-Boy®

If you're looking for a profitable spare-time business for yourself... then see how you can make steady money with an International Cub Lo-Boy! Jobs listed here are just a few of the many you can handle completely with the low-cost, 10 hp Cub Lo-Boy. You can get started for as little as \$250, pay the balance monthly as you earn. Write International Harvester Co., Dept. PS4, P.O. Box 7333, Chicago 80, Ill., for information kit. Write today!



**INTERNATIONAL
HARVESTER**

Mow	Dig holes
Plow	Saw wood
Disk	Spray trees
Drag	Pump water
Doze	Load
Excavate	Haul
Clear snow	Tow
Mix concrete	Sweep



Own and Play the ACCORDION

for fun...for popularity...for profit!

SAVE UP TO 50%
on famous
ITALIAN MAKES

Buy direct at amazing savings from America's biggest importer of fine Italian made accordions. **5 DAY FREE TRIAL!** Easy Terms. Free Lessons—Easy to learn. Personalized selection service. Trade-ins accepted. Write today for big Color Catalog and our low wholesale prices. **FREE!** Accordion Manufacturers & Wholesalers Outlet

2003 West Chicago Avenue • Dept. P-48 • Chicago 22, Illinois

IT'S EASY TO PAINT WINDOW SASH!

The "Marvel Paint Brush Guide" is automatically controlled by a **PATENTED** recoiling guard that shields the bristles and keeps paint off the glass—protects adjoining surfaces when painting walls or trim.



**"DO A
PROFESSIONAL
JOB YOURSELF"**

Guide complete with a
1" Pure Bristle
Brush

\$2.98 Postpaid (No C. O. D.'s)

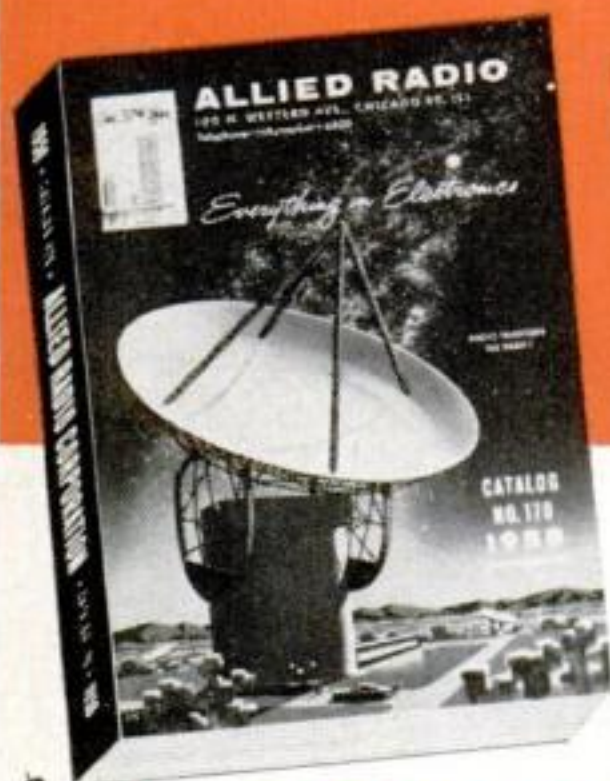
WATRO MFG. CO. DEPT. 48, 156 MUIR AVE.,
HAZLETON, PENNA.

WITH
Sonotone®
PHONO CARTRIDGES
you can hear the
difference



When you buy or modernize
your record player, insist on
Sonotone Ceramic Cartridges

Free! ALLIED'S 1958 ELECTRONIC SUPPLY CATALOG



404
value-packed
pages

Send
for it!

SAVE on
everything in
electronics

EASY TERMS
AVAILABLE

WORLD'S LARGEST STOCKS

Here's everything in Electronics for Experimenters, Builders, Amateurs, Servicemen, Engineers and Hi-Fi Hobbyists:

- Amazing Build-Your-Own KNIGHT-KITS
- Hi-Fi Music Systems & Components
- Recorders & Phono Equipment
- TV Tubes, Antennas, Accessories
- Public Address Systems
- Amateur Station Equipment
- Latest Test Instruments
- Industrial Electronic Supplies
- Parts, Tubes, Transistors, Tools and Books

SAVE on everything in Electronics—get fast, dependable service—send today for your FREE 1958 ALLIED Catalog.

Everything in Electronics
From One Reliable Source

our 37th year

send for
FREE
Catalog

ALLIED RADIO

ALLIED RADIO CORP., Dept. 7-D8
100 N. Western Ave., Chicago 80, Ill.

☐ Rush FREE 1958 ALLIED 404-Page Catalog

Name _____

Address _____

City _____ Zone _____ State _____

REPAIR ANY WATCH



... Swiss or American

No previous experience needed to learn modern watch repair. An enjoyable hobby or profitable career. Unique Sweazey System starts you making repairs right away. Develops your skill step by step. Teaches you modern shop methods... professional short cuts... mistakes to avoid. Learn by personal attendance or spare time home study. Free sample lesson. No obligation. Write today!

**FREE
SAMPLE
LESSON**

CHICAGO SCHOOL OF WATCHMAKING
2330 N. Milwaukee, Dept. 448, Chicago 47, Illinois

NEW COLUMBIAN 'CUSTOMIZED' OUTBOARD PROPELLERS



The right propeller for every HULL-LOAD-HP combination and every USE. More propeller "bite," less vibration, big gas savings. Ask your dealer for literature with PROP SELECTOR CHART, or write COLUMBIAN BRONZE CORP., Freeport, N. Y.



"I Made \$14,839 in 1 Year SERVICING RADIATORS!"

Are you earning under \$8,000 a year? Hundreds now making \$10,000-\$12,000-\$15,000 a year servicing auto-truck-tractor radiators the Inland way. Easy to learn. Inland, largest radiator equipment mfr., offers complete package—equipment, merchandising, "Pays-for-itself" financing, free training. \$305 down for equipment starts you. Profitable dept. for garage or service station. Write to

INLAND MFG. CO., Dept. PS-4, 1108 Jackson St., Omaha 2, Nebr.

GROW MINIATURE TREES FREE! SEEDS & PLAN



New Fascinating HOBBY or HOME-BUSINESS OPPORTUNITY! Learn little-known techniques for growing living "Ming" Trees only inches high. Beautiful Elm, Cherry, Orange, Cypress, Peach, etc., that BLOSSOM AND BEAR TINY TASTY FRUIT. Help Fill demand for these sensational dwarfed Trees. FREE SEEDS (8 kinds) and Plan. State your age. Write:

MINIATURE TREE NURSERIES, Dept. U-4, (Home-Growers Division) Gardena, Calif.

10" Slide Rule



ONLY **98¢** postpaid

ANYONE WHO UNDERSTANDS SIMPLE 7TH GRADE ARITHMETIC CAN USE THIS STANDARD SLIDE RULE!

Be modern—use this quick easy way of figuring. For business men, students, carpenters, machinists, salesmen, printers and engravers, office workers, farmers, merchants, time keepers, plumbers, electricians—everyone who does figuring can save time and labor with this slide rule.

FREE Illustrated Instruction book shows you how to get correct answers instantly without pencil and paper. (You get BOTH slide rule and instruction book for only 98¢ postpaid. Satisfaction guaranteed or refund.)

Nelson-Hall Co., 210 S. Clinton, Dept. 2DS-1, Chicago 6

Cast your ballot for a successful future!

256 I.C.S. COURSES



Whether you stand at a machine or sit at a desk . . . whether you're making \$75 a week or \$75 hundred a year . . . whether your interest is Power Plants or Paper Pulp, Advertising or Electronics . . . chances are I.C.S. has exactly the course you need to get ahead.

I.C.S. is not only the oldest and largest correspondence school. It also offers the most courses, 256 in all. Each one success-proved by graduates who rose to top technical and administrative positions. Chief engineers. Superintendents. Foremen. Managers. Executive assistants.

I.C.S. Courses cover bedrock facts and theory plus practical, on-the-job applications. No skimping. Texts

are prepared by leading business and industrial authorities working with I.C.S. editors and educators. They are constantly being reviewed and revised in line with current developments.

As an I.C.S. student, you study in your spare time, set your own pace. No time lost getting to class or waiting for slower students to catch up. If you wish, I.C.S. will make progress reports to your employer. You win recognition as a "comer," one who is ready to move ahead. Thousands of students report pay increases and promotions within a few months of enrollment. All graduates win the coveted, approved I.C.S. diploma.

3 FREE BOOKS! Check the subject that interests you in the coupon below. I. C. S. will rush you (1) a special book outlining your opportunities in this field, (2) the 32-page gold mine of career tips, "How to Succeed," (3) a sample I. C. S. lesson (Math.) demonstrating the famous "I. C. S. Method." "X" MARKS OPPORTUNITY.



For Real Job Security—Get an I. C. S. Diploma! I. C. S., Scranton 15, Penna.

Accredited Member,
National Home Study Council

INTERNATIONAL CORRESPONDENCE SCHOOLS



BOX 23314D, SCRANTON 15, PENNA.

(Partial list of 257 courses)

Without cost or obligation, send me "HOW to SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X (plus sample lesson):

ARCHITECTURE and BUILDING CONSTRUCTION

- ☐ Air Conditioning
- ☐ Architecture
- ☐ Arch. Drawing and Designing
- ☐ Building Contractor
- ☐ Building Estimator
- ☐ Carpentry and Millwork
- ☐ Carpenter Foreman
- ☐ Heating
- ☐ Interior Decoration
- ☐ Painting Contractor
- ☐ Plumbing
- ☐ Reading Arch. Blueprints

ART

- ☐ Commercial Art
- ☐ Magazine & Book Illus.
- ☐ Show Card and Sign Lettering
- ☐ Sketching and Painting

AUTOMOTIVE

- ☐ Automobiles
- ☐ Auto Body Rebuilding and Refinishing
- ☐ Auto Engine Tuneup
- ☐ Auto Technician

AVIATION

- ☐ Aero-Engineering Technology
- ☐ Aircraft & Engine Mechanic

BUSINESS

- ☐ Accounting
- ☐ Advertising
- ☐ Business Administration
- ☐ Business Management
- ☐ Cost Accounting
- ☐ Creative Salesmanship
- ☐ Managing a Small Business
- ☐ Professional Secretary
- ☐ Public Accounting
- ☐ Purchasing Agent
- ☐ Salesmanship
- ☐ Salesmanship and Management
- ☐ Traffic Management

CHEMICAL

- ☐ Analytical Chemistry
- ☐ Chemical Engineering
- ☐ Chem. Lab. Technician
- ☐ Elements of Nuclear Energy
- ☐ General Chemistry
- ☐ Natural Gas Prod. and Trans.
- ☐ Petroleum Prod. and Engr.
- ☐ Professional Engineer (Chem)
- ☐ Pulp and Paper Making

CIVIL ENGINEERING

- ☐ Civil Engineering
- ☐ Construction Engineering
- ☐ Highway Engineering
- ☐ Professional Engineer (Civil)
- ☐ Reading Struc. Blueprints
- ☐ Structural Engineering
- ☐ Surveying and Mapping

DRAFTING

- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Drafting Machine Design
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Sheet Metal Drafting
- ☐ Structural Drafting

ELECTRICAL

- ☐ Electrical Engineering
- ☐ Elec. Engr. Technician
- ☐ Elec. Light and Power
- ☐ Practical Electrician
- ☐ Practical Lineman
- ☐ Professional Engineer (Elec)

HIGH SCHOOL

- ☐ High School Diploma

- ☐ Good English
- ☐ High School Mathematics
- ☐ Short Story Writing

LEADERSHIP

- ☐ Industrial Foremanship
- ☐ Industrial Supervision
- ☐ Personnel-Labor Relations
- ☐ Supervision

MECHANICAL and SHOP

- ☐ Diesel Engines
- ☐ Gas-Elec. Welding
- ☐ Industrial Engineering
- ☐ Industrial Instrumentation
- ☐ Industrial Metallurgy
- ☐ Industrial Safety
- ☐ Machine Design
- ☐ Machine Shop Practice
- ☐ Mechanical Engineering
- ☐ Professional Engineer (Mech)
- ☐ Quality Control
- ☐ Reading Shop Blueprints
- ☐ Refrigeration and Air Conditioning
- ☐ Tool Design
- ☐ Tool Making

RADIO, TELEVISION

- ☐ General Electronics Tech.

- ☐ Industrial Electronics
- ☐ Practical Radio-TV Eng'r'g
- ☐ Practical Telephony
- ☐ Radio-TV Servicing

RAILROAD

- ☐ Car Inspector and Air Brake
- ☐ Diesel Electrician
- ☐ Diesel Engr. and Fireman
- ☐ Diesel Locomotive

STEAM and DIESEL POWER

- ☐ Combustion Engineering
- ☐ Power Plant Engineer
- ☐ Stationary Diesel Engr.
- ☐ Stationary Fireman

TEXTILE

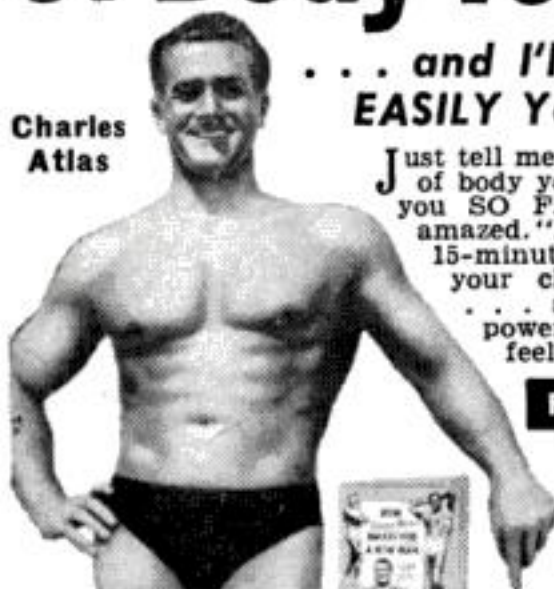
- ☐ Carding and Spinning
- ☐ Cotton Manufacture
- ☐ Cotton Warping and Weaving
- ☐ Loom Fixing Technician
- ☐ Textile Designing
- ☐ Textile Finishing & Dyeing
- ☐ Throwing
- ☐ Warping and Weaving
- ☐ Worsted Manufacturing

Name _____ Age _____ Home Address _____
 City _____ Zone _____ State _____ Working Hours _____ A.M. to P.M. _____
 Occupation _____

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special tuition rates to members of the U. S. Armed Forces.

Check the Kind of Body You Want

Charles Atlas



... and I'll Show You How EASILY You Can Have It!

Just tell me, in coupon below, the kind of body you want—and I'll give it to you SO FAST your friends will be amazed. "Dynamic Tension," my easy, 15-minutes-a-day method, will make your chest and shoulders bulge ... arms and legs surge with power ... your whole body feel "alive!"

FREE BOOK Learn how I became "World's Most Perfectly Developed Man"—Mail coupon! CHARLES ATLAS, Dept. 14, 115 East 23rd Street, New York City 10, N. Y.

CHARLES ATLAS, Dept. 14, 115 East 23rd St., New York 10, N. Y.

Dear Charles Atlas: Here's the Kind of Body I want:

(Check as many as you like)

- ☐ More Weight—Solid—in ☐ Powerful Arms, Legs, Grip the Right Places
☐ Broader Chest, Shoulders ☐ Slimmer Waist, Hips
☐ Better Sleep. More Energy

Send me absolutely FREE a copy of your famous book showing how "Dynamic Tension" can make me a new man—32 pages, crammed with photographs, answers to vital questions, and valuable advice. No obligation.

NAME _____ AGE _____

ADDRESS _____

CITY _____ STATE _____

3 University WAYS TO BETTER HI-FI

FREE!

Yours for a 2c postcard



3 informative booklets to help you select the high fidelity loudspeaker, enclosure kit, or deluxe speaker system best suited to your taste and purse. Here's a complete range of choice ... offered by the world's largest custom loudspeaker manufacturer.

P.S.E.—Progressive Speaker Expansion

Most revolutionary development in speaker history. P.S.E. shows you how to start an excellent basic system now at low cost, and build up to a superb deluxe system at any time without discarding original components.

SPEAKER ENCLOSURE KwiKits

Best for design, construction, ease of assembly ... and performance. Substantial savings for do-it-yourself fans. Outclass many "factory-assembled" enclosures.



SPEAKER SYSTEMS

Designed to meet every listening requirement, every decor, every budget ... perfectly integrating the most advanced loudspeaker components with precisely crafted decorator cabinets. You haven't really heard high fidelity until you've heard University Speaker Systems.

Write today, listing booklets desired.

UNIVERSITY LOUDSPEAKERS, INC.

Desk B-4, 80 So. Kensico Ave., White Plains, N.Y.

LISTEN

University sounds better



INSURED TIRE SERVICE POPULAR BRANDS

FREE

INSURANCE POLICY given with each used tire sold. We guarantee the amount of service you pay for.

NOWHERE CAN SUCH QUALITY BE FOUND AT SUCH LOW PRICE!

SPECIAL! Deduct 10% on orders for two or more used tires

YOU CAN'T LOSE!!

Super Quality —		Rugged Performance —		6 Months Insured Service	
600x16	\$3.65	670x15	\$3.95	700x16	\$4.45
650x15	3.85	670x16	4.05	710x15	4.35
650x16	4.25	700x15	3.95	760x15	4.45
				550x17	4.65

Supreme Quality—Nothing Finer—12 Months Insured Service		6 Months Insured Service	
600x16	\$5.25	475x19	\$5.45
600x16(6)	6.75	640x15	4.95
650x16	5.75	670x15	5.35
650x16(6)	7.25	710x15	5.45
700x16	6.35	760x15	5.95
750x16(6)	8.45	800x15	6.35
550x18	4.95	820x15	6.35
550x17	4.75	550x15	5.35
650x15	5.25	670x16	5.15
700x15	5.35	700x16(6)	10.25
		32x6(10)	12.75

Whitewalls \$1.00 extra.

MIDLAND TIRE SALES

Speedy shipments on Mail Orders. F.O.B. Chicago. Insurance policy sent with each order. Deduct 10% on orders for 2 or more used tires. Send CHECK or MONEY ORDER.—No COD's. 3701 S. Normal, Dept. 55-66, Chicago 9, Ill.

EXCLUSIVE! PRE-ASSEMBLED KITS! FREE CATALOG ... SEND TODAY!



New! Pre-assembled kits save up to 2/3 assembly time. Send for Free Catalog Now! Cruisers, Runabouts, 12 NEW Models 12-18'. Supermart selection of Fiberglass & Accessories.

BOAT KITS INC.

1415 W. 92nd St., Dept. A-4

Bloomington 20, Minn.

MONEY... IN HIDDEN TREASURES

GOLDAK CO.

Find it... with a GOLDAK Treasure Finder. Send for FREE literature on complete line of mineral & metal locators, underwater detectors, etc., priced as low as \$64.50.

In celebration of its 25th year, GOLDAK CO. introduces new transistor instruments for greater sensitivity — less weight — low cost flashlight batteries. Write for information today!

1544-4 GLENOAKS BLVD. GLENDALE, CALIF.



LEARN MEAT CUTTING

Train quickly in 8 short weeks at Toledo for a bright future with security in the vital meat business. Big pay, full-time jobs—HAVE A PROFITABLE MARKET OF YOUR OWN! Pay after graduation. Diploma given. Job help. Thousands of successful graduates. Our 35th year! Send NOW for FREE catalog. No obligation. G. I. Approved.

NATIONAL SCHOOL OF MEAT CUTTING, Dept. 51-C, Toledo 4, Ohio

STUDY TO BE A DOCTOR of Psychology or Metaphysics

Obtain a Ps.D., Ms.D., or Ph.D. Be a Teacher, Lecturer or Accredited Practitioner. Teach others how to achieve Health, Happiness and Contentment. Chartered by State. Correspondence courses only. Write for FREE book telling how.

THE NEOTARIAN FELLOWSHIP

Desk 5, Pickwick Building

Kansas City 6, Missouri



NOW... This Truly Professional Telescope! YOURS AT THE LOWEST PRICE EVER!

with 50, 120, 175, 375 Power

3 INCH REFLECTING TELESCOPE

Serious minded Astronomers acclaim this exciting professional telescope as the top buy of the year! 38" genuine phenolic tube is mounted on rigid 3 foot tripod with alt-azimuth and equatorial metal mount. 3" F-13 mirror aluminized and overcoated is guaranteed to resolve to Dawes limit. 4X finder scope easily locates all targets...ideal for observing man-made satellites, stars, planets, etc...with razor sharp definition. Fully guaranteed. Shipping weight 11 lbs. F.O.B.

SUFFOLK SCIENCE SERVICE Dept. P-2, Mattituck, N.Y.

NOW...FREE Astronomy Book and Star Finder Dial included with each order. Extra! Write for FREE Catalog. No obligation. No COD's. Only \$24.95

Smoothest motorcycle ever!

NEW

HARLEY-DAVIDSON

DUO-GLIDE



DUO-GLIDE—
absolutely the
finest motorcycle
ever built.

FOR A NEW CONCEPT OF POWER AND RIDING COMFORT swing aboard the DUO-GLIDE. Sleek and powerful, it's an engineering masterpiece.

New swinging-arm rear suspension coupled with Hydra-Glide front fork and spring-loaded seat post provides unexcelled comfort. Hydraulic rear brake is another Harley-Davidson exclusive. Loaded with other new features too!

Solo or with a buddy, you get a miracle ride on the DUO-GLIDE. Ask your dealer for a test ride and about his liberal trade-in deals, convenient new terms. Or write for free literature.

HARLEY-DAVIDSON MOTOR CO.

Dept. PS, Milwaukee 1, Wisconsin

EYE GLASSES by MAIL As low as \$1.95

WRITE for FREE
CATALOG with 14
LENS SAMPLE CARD

Thousands of
Customers
Est. 1939



QUALITY READING-MAGNIFYING OR
BIFOCAL GLASSES FOR FAR AND NEAR

ADVANCE SPECTACLE COMPANY, Inc.
537 S. Dearborn St., Dept. SP-4 Chicago 5, Illinois

ENGINEERING



Photo of Heald Student
in Electrical Laboratory

Enroll Now for New Term

*Heald College Ranks FIRST
West of the Mississippi
in "Who's Who in America"*

Send for FREE Information

Please send by air. Thanks

Heald Engineering College

Est. 1863

Van Ness at Post, Dept. P.S. 458
San Francisco, California

*American Industry
Steps Up Its Demand
for Trained Engineers.
Train Now at Healds*

BACHELOR OF SCIENCE DEGREE, 27 MONTHS

Degree Courses:

- ☐ Electronic Engineering
- ☐ Electrical Engineering
- ☐ Highway Engineering
- ☐ Mechanical Engineering
- ☐ Structural Engineering
- ☐ Civil Engineering
- ☐ Architecture

Diploma Courses:

- ☐ TELEVISION ☐ Color TV
- ☐ Electronic Technician
- ☐ Industrial Electronic Tech.
- ☐ Tool & Die Design
- ☐ Architectural Drafting
- ☐ Mechanical Drafting
- ☐ Structural Drafting
- ☐ Surveying
- ☐ Estimating
- ☐ Master Electrician

Approved for Veterans

NAME _____

STREET _____

CITY _____

STATE _____

LEARN UPHOLSTERY

in your spare time
run your own
business AT HOME

**FREE BOOK
SAMPLE
LESSON**

WITH COURSE
YOU MAKE

SLIPPER
CHAIR

CLUB
CHAIR

OTTOMAN

PLUS
SLIP COVERS

BE YOUR OWN BOSS
Earn more from the start while learning! Set up your own profitable business at home, enjoy steady income, independence—in the booming field of Custom Furniture Upholstery.

EARN WHILE YOU LEARN . . . the easy UTS way.
Right off you start with tools, complete frames, fabrics, materials, included FREE with your practical, the N.Y. State-approved UTS course. You learn skilled professional custom upholstery, reupholstery, furniture finishing, repairs; to make slip covers, window cornices, cushions, draperies in your spare time. Send for FREE Illustrated Book, Sample Lesson

Get ready for well-paid job, steady work and big profits as your own boss. Also Training in N.Y. School. APPROVED FOR VETERANS.

MAIL COUPON TODAY. No obligation.

UPHOLSTERY TRADES SCHOOL
Dept. GD-1610, 721 Broadway, N. Y. 3

Please send me FREE book with FREE Sample Lesson. No obligation—no salesman will call.

☐ Home Study ☐ In N.Y. School Training

Name _____

Address _____

City _____ Zone _____ State _____

☐ Check if Korean Veteran

...TURN CONCRETE INTO GOLD!



MAKE UP TO \$75 A DAY IN YOUR OWN BUSINESS

If you want to have your own business — to start a business on your own — here's your big opportunity! New high speed, low cost General block machine produces up to 1,000 concrete blocks a day. Sell all you make to builders, supply houses, and others for homes, factories, buildings, garages. Cash in on the building boom! You can make profits of 100% to 150% — up to \$75. a day! General block machine equipped with 1/2 h.p. electric motor — or can be supplied with gasoline engine — works anywhere, in little space, indoors or out. Operates from ordinary house light socket. Simple, foolproof 3 step operation — so easy a child can do it. Makes superior 3 core blocks any size from 4" to 12". Also makes chimney, sash, corner and other types. Blocks meet any building code anywhere in the country. Materials — sand, water, cement, available anywhere. Simple illustrated operating instructions and mixing formulae for cement and cinder blocks supplied with each machine. Write for FREE folder with full information.

MOTOR DRIVEN

R.L.T. of New York City reports: "MY GENERAL BLOCK MACHINE PAID FOR ITSELF IN FIRST 2 WEEKS!" Hundreds now in use the world over! Write for FREE details today!

EXTRA

book gives floor plans for 6 sensational concrete block bungalows. Tells how to lay blocks, lay out building lines, mix concrete, build steps, porch and concrete floors all at great savings. Written by experts. Can save many times the cost of the machine! Get it now! No strings attached. Send \$1.

BOOK SENT FREE IF YOU BUY MACHINE.
\$1 REFUNDED IF YOU BUY LATER.

GENERAL ENGINES CO.

DEPT. S-48

ROUTE 130, THOROFARE, N. J.

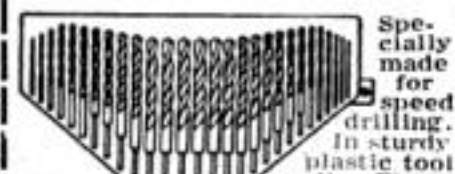
75c ea. for Finest Imported PRECISION PLIERS!

• Flat Nose • Combination • Diagonal Cutter • End Cutting Nippers • Round Nose • One Side Flat — One Side Round • Snipe

FOR JEWELERS, OPTICAL WORKERS, HOBBYISTS, CRAFTSMEN OF ALL KINDS! These superb European instruments are of deep-forged, heat-treated high quality tool steel, fabricated to most exacting specifications. All-over ground and polished to smooth hard surfaces. Smooth working joints with just the right tension. Jaws meet perfectly to safely and securely hold even the most delicate objects in the hard-to-reach corners and angles. Each plier is 4" long and a veritable gem of precision and strength.

75c each . . . ALL 7 for \$5.00 ppd.

CHROME VANADIUM 29 Pc. DRILL SET



Specialty made for speed drilling. In sturdy plastic tool roll. Finest alloy steel drills hardened and precision ground to the sharpest, longest lasting cutting edge obtainable; will easily and cleanly bite through hardwoods, plastics, aluminum, iron and the toughest steels. Unconditionally guaranteed for thousands of drillings. Full jobber lengths. Sizes by 64ths from 1/16" to 1/2". NOW \$6.49 ppd. Also available with Turned Down Shanks to fit all 1/4" drills. In individual pocket roll \$8.95 ppd.

60 Pc. Set Wire Gauge CHROME VANADIUM DRILLS



Top quality German import high test Chrome Vanadium Drills designed for speed drilling through toughest steels, woods, plastics, iron and aluminum. Precision ground, long-lasting cutting edges. Guaranteed to give years of satisfaction. A full 60 pc. set. Nos. 1 through 60. A \$14.95 value — NOW ONLY \$5.40

PLUS 35c PP. & HDLG. Same set above available with Huot Metal Index container. PLUS 35c PP. & HDLG. Also Available

20 Pc. Set — Nos. 61-80 WIRE GAUGE DRILLS In plastic kit with marked pocket for each drill. ONLY \$2.50 ppd.

COMPLETE POWER TOOL ACCESSORY SET 100 PIECES Designed for use in all 1/4" capacity Electric Drills and Motor Chuck

A complete power tool accessory set that can handle almost any job of grinding, sawing, cutting-off, polishing, buffing, reaming, sanding, drilling, cleaning, etching, etc. KIT CONTAINS: Wire Wheel, Mounted Grinding Wheels, Rotary File, Abrasive Cartridge Rolls, Circular Saw Blade, Felt Bob and Wheels, Honing Stones, Jewelers Rouge, Buffing Wheels, Midget Steel Cutters, Bristle Brushes, Abrasive Sheets and sufficient Arbors to accommodate all the unmounted items.

Over \$15 value . . . only \$4.98 ppd

Send Check or M.O. C.O.D. fee extra MONEY BACK GUARANTEE

SCOTT-MITCHELL HOUSE, INC. Dept. E-4, 611 Broadway New York 12, N. Y.

Shrinks Hemorrhoids New Way Without Surgery

Science Finds Healing Substance That Relieves Pain—Shrinks Hemorrhoids

For the first time science has found a new healing substance with the astonishing ability to shrink hemorrhoids and to relieve pain—without surgery.

In case after case, while gently relieving pain, actual reduction (shrinkage) took place.

Most amazing of all—results were so thorough that sufferers made astonishing statements like "Piles have ceased to be a problem!"

The secret is a new healing substance (Bio-Dyne*) —discovery of a world-famous research institute.

This substance is now available in *suppository* or *ointment* form under the name *Preparation H.** Ask for it at all drug counters—money back guarantee.

*Reg. U.S. Pat. Off.

GET INTO ELECTRONICS

V.T.I. training leads to success as technicians, field engineers, specialists in communications, guided missiles, computers, radar, automation. Basic & advanced courses in theory & laboratory. Assoc. degree in 29 mos. B.S. obtainable. ECPD accredited, G.I. approved. Graduates with major companies. Start Sept., Feb. Dorms, campus. H.S. graduate or equivalent. Catalog.

VALPARAISO TECHNICAL INSTITUTE
DEPT. S VALPARAISO, INDIANA

TERMITES IN YOUR HOUSE? GET RID OF THEM YOURSELF!

Don't pay \$300 and up to eradicate termites from your home or prevent infestation. Do it yourself in one afternoon Easily! Quickly! Inexpensively with "TERM-OUT"! Send stamp for handbook.



COMPASS RESEARCH
701-B INVESTMENT BLDG., PITTSBURGH 22, PA.



MEN WANTED

Earn \$100 Per Week and up
AUTO DIESEL MECHANICS

Master a trade with a future—learn Auto-Diesel mechanics in our shops. You learn with tools on real equipment. Earn while you learn. Many of our graduates earn \$100 per week and up. No previous experience necessary. Day and night courses. Approved for veterans. Write for free bulletin.

NASHVILLE AUTO-DIESEL COLLEGE

226 7th Ave., N., Dept. 41

Nashville 3, Tenn.

YOU'RE SURE OF QUALITY WHEN IT'S . . .

PROCESSED BY KODAK



... and you're sure of GENUINE KODAK PROCESSING when you use Fасolor's Prepaid Kodak Processing Labels to mail Kodachrome films direct to Kodak.

1-K135 (20x) Label . . . \$1.50; 3 or more \$1.35 ea.
1-8mm. 25' Movie Label \$1.60; 3 or more \$1.45 ea.

KODACHROME FILM Including KODAK PROCESSING

1 Roll K135 (20x) . . . \$3.35*; 3 or more \$3.00* ea.

1 Roll 8mm. 25' . . . \$4.00*; 3 or more \$3.60* ea.

*Prepaid Processing Label With Each Roll of Film

Specify Daylight or Flash. Send for Full Price List.

FASCOLOR SERVICE, INC.
34 FULMAR BLDG. • BOX 86
ROCHESTER 1, N. Y., Home of Kodak

The ONLY spark plug in the world
with the PATENTED* AUTOMATIC
"BUILT-IN-BRAIN"

ALDOR
THERMO-REACTOR
PATENTED

SPARK
PLUGS

AVAILABLE IN 2 TYPES

1 Thermo "SPECIAL"
Reactor

Engineered SPECIFICALLY for todays
new car, high compression, high
horsepower engine, or the older car
with a tight, high compression en-
gine in good condition!

2 Thermo "REGULAR"
Reactor

(OIL FIRING—NON FOULING)

Engineered SPECIFICALLY for older
engines, and worn engines using
excessive amounts of oil.

SELF-CLEANING—WILL NOT FOUL!
Actually FIRES IN OIL!

Aldors specially designed single hi-efficiency "D-H"
electrode can be instantly and accurately adjusted to
perfect gap, unlike many so-called multiple electrode
"miracle" plugs!

Millions in daily use in the U.S. and in over 30
foreign countries; Designed to outlast and out-
perform any other plug!

Patent #2442945*

Thermo-Reactor plugs also sold
under the following trade name

Doering
DISKOMATIC



Post Paid
MONEY BACK
GUARANTEE

Some plugs are designed for stop-and-go city
driving, and will misfire, cause pre-ignition and
dangerous power loss when used in higher speed
highway driving;

Other plugs are designed for higher speed driving
and become fouled, cause misfiring and power
loss when used in stop-and-go city driving!

ONLY Aldor has the answer—and has it patented!

The Aldor "THERMO-REACTOR" IS the ONLY
spark plug that AUTOMATICALLY adjusts its
spark to any and every DRIVING SPEED or
ENGINE CONDITION!

At low speed stop-and-go city driving
the Thermo-Reactor AUTOMATICALLY
moves away from the electrode produc-
ing a spark so HOT that it completely
burns away ALL lead and carbon de-
posits CLEAN!



At higher speeds the Thermo-Reactor
again AUTOMATICALLY moves back to
the electrode producing the COLD plug
that PREVENTS power-robbing pre-
ignition!



Aldor's patented Thermo-Reactor is an engineer-
ing marvel that AUTOMATICALLY adjusts spark
when your engine ASKS for it—SOMETHING NO
OTHER PLUG CAN DO!

For instant starting, faster power response,
smoother trouble free driving, install a set of
Patented Thermo-Reactor spark plugs—do it
TODAY!

On sale at better auto accessory stores, garages, and serv-
ice stations—Ask for them by name!

If not available locally send check or money order, or
C.O.D. (state year, make and model of car or type of engine)
IMPORTANT: Request either the "SPECIAL" or "REGULAR".

A. L. DOERING SPARK PLUG CORP.
3 STATION PLAZA, BAYSIDE 61, N. Y.

Manufacturers of spark plugs exclusively since 1914!

75 POWER TELESCOPE \$3.98
25X-45X-75X

NEW 3 in one telescopes, 3 variable 25X
45X-75X magnification. Brass bound.
25 power for ultra bright images
45 & 75 power for long range.
Guaranteed to bring dis-
tant stars, moons, ob-
jects, sports 75
times closer.

Most powerful
scope sold anywhere
near this amazing low
price. American made, 5 sections.
Opens 36", closes 1 ft.; contains 4 ground
& polished lenses. Can also be used as powerful com-
pound microscope. Mass production enables us to offer tele-
scope complete at \$3.98 postpaid. Money back guarantee.
CRITERION CO., Dept. PSB 58, 331 Church St., Hartford, Conn.

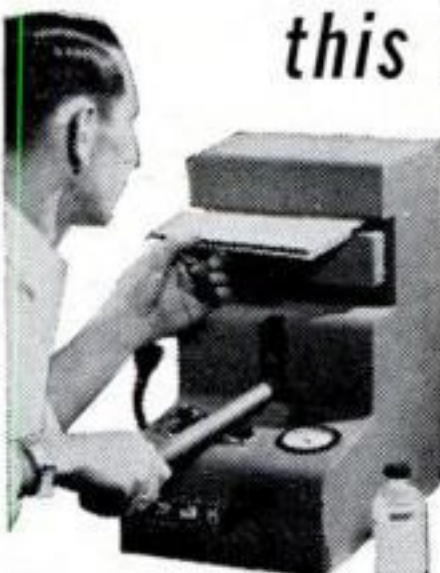
**BECOME AN EXPERT IN
TRAFFIC**

Traffic men earn \$4,000 to \$10,000 and up. Thousands of firms need
experts on rates, tariffs, regulations. We train you thoroly in spare
time at home for executive traffic jobs. Personal training under traffic
authorities. Placement counsel and help. Write for free 48-page book
"Traffic Management—the Fast Growing Profession."

LASALLE Extension University, 417 So. Dearborn St.
A Correspondence Institution Dept. 483T Chicago 5, Ill.

WITH MY MAGIC MAIL PLAN

this Little Machine can make you \$5.00 an hour



THIS man is taking out a Plastic
Sealing Job . . . ordered by mail.
Only 11c in material cost brings
back \$2.58 in cash! Pays \$5 profit
per operating hour.

Write today for free facts about the newest and
most fascinating of all homeoperated businesses.
For the first time, a simplified machine brings the
fabulous profits of Plastic Sealing and Plastic
Laminating within reach of the small operator.
Anyone can operate the machine with a few
minutes practice. Then—with our MAGIC
MAIL PLAN—can get mail orders pouring in
daily with cash in every envelope.

No Canvassing or Selling

Fill orders at home in spare time to start. Then
expand to full-time business. We even supply cir-
culars to bring back cash and orders. Rush cou-
pon for all the facts you need to start or a card
will do. No charge. Write today.

WARNER ELECTRIC CO.
1512 Jarvis Ave., Dept. L-3-D, Chicago 26, Ill.

**FREE! MAIL THIS
COUPON**

WARNER ELECTRIC CO., 1512 Jarvis Ave.
Dept. L-3-D, Chicago 26, Ill.

Please rush me free and without obligation
complete information, postage paid.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

APRIL 1958 45

EARN MORE—LEARN TO BE AN

AUTO MECHANIC

OR TRAIN WITH OTHER GREER DIPLOMA COURSES

- | | |
|--|---|
| <input type="checkbox"/> AUTO MECHANICS | <input type="checkbox"/> REFRIGERATION |
| <input type="checkbox"/> DIESEL MECHANICS | <input type="checkbox"/> AIR CONDITIONING |
| <input type="checkbox"/> BODY & FENDER REPAIR | <input type="checkbox"/> MACHINIST TRADE |
| <input type="checkbox"/> GAS-ARC WELDING | <input type="checkbox"/> ADVANCED MACHINIST |
| <input type="checkbox"/> PIANO TUNING & REPAIR | |

Skilled men are needed in every part of the country. Earn top pay in established shops or start your own business. Greer's expert instruction and actual shop training teaches you how. You learn by doing—quick, easy courses using the latest tools and equipment. Day, evening and part time instructions available.

Job placement and convenient living accommodations are yours while training. Contact GREER'S FREE JOB PLACEMENT SERVICE when you enroll if you wish part time or full time employment.

ENGINEERING DEGREE COURSES

- | |
|--|
| <input type="checkbox"/> DIESEL AUTOMOTIVE ENGINEERING 27 MOS. |
| <input type="checkbox"/> REFRIGERATION & AIR COND. ENGINEERING 18 MOS. |
| <input type="checkbox"/> WELDING ENGINEERING 18 MOS. |

All Courses Approved ☐ Civ. or ☐ G.I.

Please rush me free literature on Auto Mechanics, or on the trade indicated, at no obligation.

NAME _____ AGE _____

STREET _____

TOWN _____ ZONE _____ STATE _____

Established 1902

GREER SHOP TRAINING

Box D, 2238 S. Michigan Ave.

Chicago 16, Illinois

Rip Van Winkle Couldn't Sleep with Nagging Backache

Now! You can get the fast relief you need from nagging backache, headache and muscular aches and pains that often cause restless nights and miserable tired-out feelings. When these discomforts come on with over-exertion or stress and strain—you want relief—want it fast! Another disturbance may be mild bladder irritation following wrong food and drink—often setting up a restless uncomfortable feeling.

For quick relief get Doan's Pills. They work fast in 3 separate ways: 1. by speedy pain-relieving action to ease torment of nagging backache, headaches, muscular aches and pains. 2. by their soothing effect on bladder irritation. 3. by their mild diuretic action tending to increase output of the 15 miles of kidney tubes.

Find out how quickly this 3-way medicine goes to work. Enjoy a good night's sleep and the same happy relief millions have for over 60 years. Ask for new, large size and save money. Get Doan's Pills today!



BARBELLS

140-Pound, CHROME DELUXE Barbell-Dumbbell set only \$18.80.

This is our feature set and is the finest ever manufactured. Training with adjustable weight is the BEST way to keep fit; the ONLY way to develop great strength and a perfect body. As the oldest and best equipped barbell company, BUR gives value and prices no one can equal.

SEND FOR FREE CATALOG.

BUR BARBELL CO.

Lyndhurst 5, New Jersey

100
POUND
SET
\$11.80

Extra
Plates Only
10c Pound

Catalog of 3200 Novelties 10c

Send 10c for amazing catalog of novelties, live animals, scientific supplies, hobbies, funmakers, planes & boats, looms, magic tricks, joke articles, unusual seeds, gadget timesavers, cameras, optical goods, projectors, movies, lucky jewelry, religious novelties, disguises, musical instruments, stamps, coins, puzzles, fortune tellers, radios, auto & bike accessories, telescopes, magnifiers, compasses, banks, smokers' gadgets, artists' supplies, printing sets, engines, motors, shockers, knives, billfolds, fireworks, guns, rifles, sports, books, games, plants, etc. Send name, address & 10c to: JOHNSON SMITH & CO., Dept. 443 Detroit 7, Michigan



FIX home & car APPLIANCES YOURSELF

NEW! EICO® READI-TESTER

KIT \$12.95 Factory-wired \$15.95

All-in-one MULTI-RANGE ac/dc voltmeter, ammeter, ohmmeter, wattmeter, leakage checker. Locates defects in irons, fans, refrigerators, mixers, air-conditioning, TV & radio tubes and parts, batteries, generators, etc. Easy Instruction Book has introduction to electricity & procedures for common repair jobs. Examine EICO's complete line of 50 professional instruments & kits — Write for FREE Catalog PS-4

Electronic Instrument Co., Inc., 33-00 Northern Blvd., L.I.C. 1, N.Y.



BUILD and FLY

Bensen

HELICOPTER

Glider type 'copter—easy to build, simple to fly. Can also be mounted on floats or boat. No pilot's license required. Order 3-view drawings, specs and photo for \$1. Motor powered Gyro-Copter drawings \$2.

Ask about detailed plans and construction kits.

BENSEN AIRCRAFT CORP., Dept. PS-48

P. O. Box 2725, Raleigh, N. C.

Name.....
Address.....

Make \$500 an Hour CASH PROFIT THE DAY YOU START!



START YOUR OWN BUSINESS AT HOME... SHARPEN HOUSEHOLD, GARDEN AND SHOP TOOLS IN SPARE TIME

Now you can turn spare time into Big Cash Profits with new Belsaw Sharp-All. Sharpen knives, scissors, shears, snips, ice skates, mower blades, hedge trimmers, grass whips, axes, chisels, screw drivers, scrapers and saws... just about any household, garden and shop tool. Your own CASH business with no inventory. No calls to make. No experience needed.

Learn how easily you can start your own spare time business. Amazing low cost easy-payment plan. Send postcard for FREE BOOK.

BELSAW SHARP-ALL CO
708 Field Bldg. • Kansas City 11, Missouri

FREE
BOOK

NO LAYOFFS for men skilled in ... DRAFTING!

LEARN AT HOME . . . QUICKLY . . . IN YOUR SPARE TIME!

Strikes and layoffs are nightmares of the past. C.E.I. training opened the door to a wonderful future for me and my family.

H. Oeftering, Ohio

My C.E.I. training has advanced me from a job as a laborer to a position as Jr. Engineer with big pay increase.

J. Morgan, California

Job security, rapid advancement, big pay checks are only a few of the many benefits enjoyed by men with a C.E.I. diploma.

The opportunities available to well-trained draftsmen were never greater! The President is deeply concerned about the shortage of technically trained men such as draftsmen. The need for skilled draftsmen is tremendous and is growing daily. This vital shortage has existed for 15 years and will continue for at least 20 more years. Never has such golden opportunity been offered men like YOU!

Drafting is the only field which makes it possible for you to obtain easily, without any special background or experience, a professional, well paying, secure, important future. C.E.I.'s staff of licensed professional engineers show you how to gain this goal in only a few short months of spare time study! What a Cleveland Engineering Institute diploma has done for thousands of others, it can do for YOU, too! Write for full information today!

★ VETERAN APPROVED

YOUR CHOICE OF EASY, LOW PAYMENT PLANS. NO CARRYING CHARGES!

PROFESSIONAL EQUIPMENT AND SUPPLIES FREE OF EXTRA COST!



CLEVELAND ENGINEERING INST., DEPT. PS-4H
6300 Euclid Ave. Cleveland 3, Ohio
Please RUSH my Free Success Book and Lesson
☐ Aeronautical ☐ Mechanical
NAME Age
ADDRESS
CITY STATE
No Obligation — No Salesmen

CLEVELAND ENGINEERING INSTITUTE

**SAVE & MORE
HALF** on NEW

FAMOUS
BRAND
REJECT

TIRES

Not 2nds, Not used or recaps or retreads!

Our tremendous buying power enabled us to get these new factory reject tires below wholesale. Don't wait. Quantities limited.
Golden Rule 12 MONTH GUARANTEE Instant replacement on any defective tire, frt. excl.

640-15	\$7.95	670-15	\$7.95	600-16(6)	\$8.95	825-20	\$23.25
800-14	9.75	710-15	8.45	650-16(6)	10.25	900-20	24.25
700-17	15.50	760-15	8.95	750-16	12.60	1000-20	27.50
750-20(10)	21.50	700-15(6)	12.00	700-20	16.50	1100-20	28.50
750-14	9.25	700-16(6)	12.50	750-20(8)	18.50	1000-22	27.50

You must usually add tax & trade-in to your local White Walls dealer's prices. NOT HERE. Our price is complete! \$1.00 extra

Very Slightly Used Tires \$3.25
White walls \$1. extra. any car

900-16 Military Mud-Grip \$16.00
Worn Slightly

MARVIN BLATT 605 Spring Garden St.
Philadelphia, Pa.

Send Check or M.O. & this ad for fast shipment, FOB Phila. I personally select your tires as if my future depended on it. BLATT Name famous for 42 years in TIRES.

Onan Emergency Electric Plants

Start automatically when highline power is cut off, supply current for lights, heating system, freezer, water pump, stove, all appliances and machines. Prevents losses and hardships. Plant stops automatically when power is restored. Compact, easy to install. 500 to 75,000 watts A.C. Priced from \$319.00.

Write for Free Folder

PORTABLE
MODELS

500 to 10,000 watts. Supply plug-in power anywhere!

D. W. ONAN & SONS INC.
3600A UNIVERSITY AVE. S. E. • MINNEAPOLIS 14, MINN.

SAVE 1/2 OR MORE

Build this six transistor
portable radio

\$34⁹⁵

No other portable gives you so many features at such a low price: 4" x 6" speaker, 500 to 1,000 hr. battery life, unbreakable plastic cabinet, plus high quality, all-transistor circuit.



IT'S EASY, FUN,
EDUCATIONAL

No special tools or skills required. Clearly illustrated step-by-step instructions guarantee your success—and you learn about electronics the easy way—BY DOING!

SEND FOR FREE CATALOG

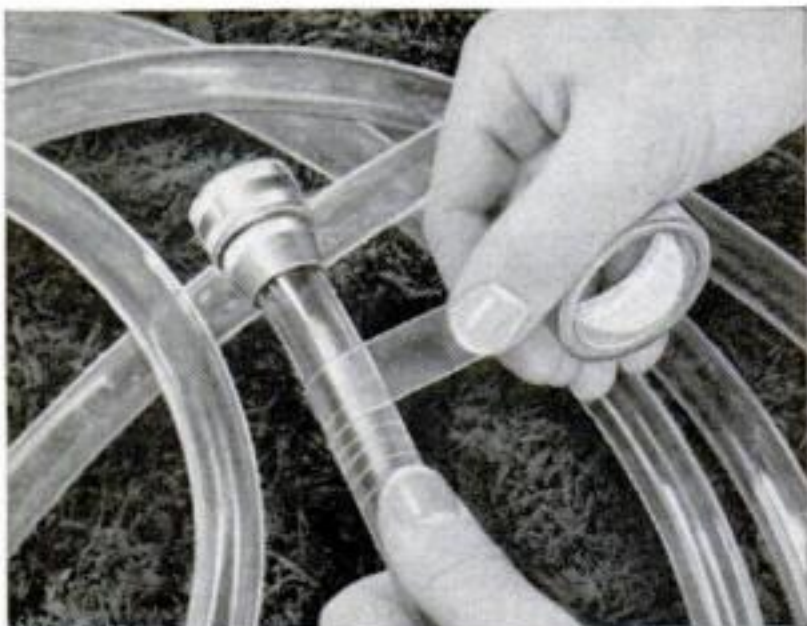
..... Describing nearly 100 other "do-it-yourself" HEATHKITS for hobby, hi-fi, ham radio or professional.

HEATH
pioneer in
"do-it-yourself"
electronics

COMPANY
BENTON HARBOR 16, MICH.
a subsidiary of Daystrom, Inc.

name
address
city & state

HOME REPAIR TIP NO. 44



Mend leaky plastic hose with tough, waterproof, "SCOTCH" Colored Plastic Tape. Stretchy tape sticks tight, resists wear, sunlight, corrosion. New clear plastic blends invisibly with any color. Also available in white, red, yellow, green, brown, blue, black. $\frac{3}{4}$ " width, 25¢; $1\frac{1}{2}$ " width 50¢ at stores everywhere.

**Don't run short...
NEXT TIME BUY TWO!**

Made by
Minnesota Mining & Mfg. Co.
St. Paul 6, Minn. ©3M Co., 1958



Some make more, some less; **T. THORN reports:**

\$690 gross in single
MONTH
IN MY OWN BUSINESS!

Start your own business!

Here's YOUR chance to start a money-making, year-'round business of your own and make the success you've dreamed about.

R. O. Donnley took in \$40 in seven hours. O. W. Ware landed a \$750 hotel job. J. S. Corbit grossed \$279.50 his first month. Homes, hotels, offices, clubs, offer you big profit possibilities. Auto upholstery also.

NO SHOP OR OFFICE NECESSARY. You clean furniture on customers' premises. No hauling. No high rents. Supplies inexpensive; operate from your home. What you take in is mostly profit.

● If you want to be your own boss—free from layoffs, strikes and bosses, we will help you to start and succeed. Don't delay...read the facts, then decide for yourself.

MAIL COUPON TODAY FOR FREE BOOK

VON SCHRADER MFG. CO.
411 "D" Pl., Racine, Wisconsin

Without obligation rush your **FREE** booklet about how I can start my own permanent, profitable electric Upholstery Cleaning business.

Name _____

Address _____

City _____ Zone _____ State _____

MODERN

**IMPROVED LAWN MOWER SHARPENER
AND BED KNIFE GRINDER**

Sharpen any mower in 10 to 20 minutes. Hand—Power—Reel or Rotary. Modern is actually two machines in one, a Precision Bed Knife Sharpener and a Precision Reel Sharpener. Extra Bed Knife Grinder is Absolutely Unnecessary. New Mower Support makes it possible to sharpen reel without removing bed knife. The fastest precision lawn mower sharpener on the market. Costs Less. Compare Modern's Many Exclusive Features Before Buying. Send for Free Brochure No. 11 SN



MODERN MANUFACTURING CO.
160 North Fair Oaks Ave., Pasadena, California

Do FALSE TEETH Rock, Slide or Slip?

FASTEETH, an improved powder to be sprinkled on upper or lower plates, holds false teeth more firmly in place. Do not slide, slip or rock. No gummy, gooey, pasty taste or feeling. **FASTEETH** is **alkaline** (non-acid). Does not sour. Checks "plate odor" (denture breath). Get **FASTEETH** at any drug counter.



HYDRAULIC JACK REPAIRS

Earn While You Learn at Home

Millions of jacks in gas & auto-service stations, truckers, body-shops, riggers, factories, farms need servicing. We show you **HOW**—easy step by step directions—what tools to use. **EARN UP TO \$5** an hour, in spare time, in your own basement or garage. Start your own business **NOW**. Write for folder No. PS-4 & free bonus offer.

Institute of Hydraulic Jack Repair

P.O. Box 50, Bloomfield, N. J.



\$\$\$ TREASURE \$\$\$

Find lost or hidden treasure with new, improved metal detector. Works around salt water. Has no ground pick-up. Find coins, jewelry, gold and silver... Civil War relics. A profitable hobby. Also Scintillation Counters. Free literature.

GARDINER ELECTRONICS Dept. 2
2545 E. Indian School, Phoenix, Arizona

GERMAN AUTOMATIC —22 CAL.

● Blank Cartridges ● Latest Model
● No Permit Required ● Fully Automatic
Self ejecting clip. Firing spring adjustable.
Precision made by the Finest West German
Gunsmiths—Wonderful for sporting events,
theatrical performances, to scare would-be
attackers, etc. 4" long, perfectly balanced.
Sold on a money back guarantee—Send \$6.69
Cash, check or Money order to:
BEST VALUES COMPANY
Dept. G-74, 403 Market St., Newark, N. J.



\$6.69

TELEPHONES

and ALL SUPPLIES

Room to room, house to garage, private telephone service.

HANDSET CRADLE TELEPHONES (2) Complete outfit with 100' wire, battery, staples, diagram CD-2 \$17.25

WORM HARVESTER—Dan Mac Magneto — gathers fish-worms by electricity. Complete with instructions. \$6.50

FREE Illustrated booklet

TELEPHONE REPAIR & SUPPLY CO.
1700 Lunt Ave.,



Dept. AA-205
Chicago 26, Ill.



GRAVELY

offers
NEW EASE
for
Country Living!



An Amazing New Experience Awaits You!

You, too, will be mighty proud when everyone marvels at the beauty of your Gravely-kept place! . . . (If they but knew the *ease* and *speed* with which you do every lawn and garden job with your versatile Gravely! . . .) Whatever the job, summer or winter, your Gravely turns in a perfect performance, *with power to spare!*

Now! 30 Tools for Every Year-Round Job!

Unmatched versatility! . . . 30 performance-proved attachments to choose from. *Plus* All-Gear Drive, Power Reverse, Push-Button Starter. Don't be satisfied with less than Gravely offers!

Write Today for Free Booklet,
"Power vs. Drudgery".

GRAVELY TRACTORS, INC.
BOX 484, DUNBAR, W. VA.

**EASY
PAY
PLAN**

WE DON'T KNOW

all the many uses for these prisms but we do know 1000's of people are finding them useful & fun — how about you?

WT. 3/4 LB.



PRISMS
\$1.50

Made for U.S. Govt. for tank periscopes. Fine optically ground, big precision prisms with silvered base. Terrific for all types of spectrographic work, in homemade telescopes & other optical systems for bending rays. Makes unusual paper weight (paint your name on it) or conversation piece for mantel. You'll find many other uses. **NEW, PERFECT!** Cost U. S. Govt. \$25 ea. **Now \$1.50 ea.** ppd. or 4 for \$5.00 ppd. Calif. res. add sales tax.

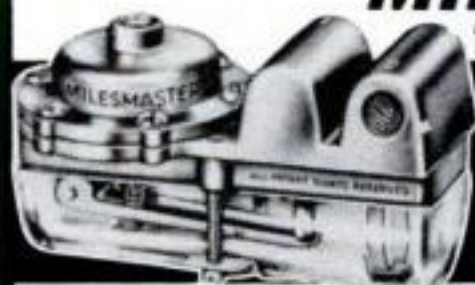
VOLUME SALES CO.

WAR ASSETS DIV.,
3930 Sunset Blvd., Dept. PS-458
LOS ANGELES 29, CALIF.

ENGINES "Sing"!

WITH

MILESMASTER®



**FUEL
PRESSURE
REGULATOR**

For smooth running, quick starting, better mileage . . . install a genuine MILESMaster. Prevents flooding. Only \$6.95

MILESMaster, INC., Dept. J, Exeland, Wisconsin

PREPARE FOR BETTER JOB, BIGGER PAY IN SPARE TIME AT HOME

Today, choose the job you want—and prepare for it in time you might otherwise waste. Or if you are already in the work you like best, start training now for quicker promotion and increased pay. During the past 61 years AMERICAN SCHOOL has helped ambitious people to reach higher goals. Check subject that interests you and mail coupon for full information.

AMERICAN SCHOOL, Dept. G446, Drexel at 58th, Chicago 37, Ill.
Without obligation, please send FREE and postpaid, full particulars about the subject checked below.

- | | | |
|--|---|---|
| <input type="checkbox"/> Accounting | <input type="checkbox"/> Contracting | <input type="checkbox"/> Mechanical Engineering |
| <input type="checkbox"/> Apprenticeship Courses | <input type="checkbox"/> Diesel Technician | <input type="checkbox"/> Mechanical Technology |
| <input type="checkbox"/> Architecture & Building | <input type="checkbox"/> Drafting—Building Trades | <input type="checkbox"/> Metalworking Courses |
| <input type="checkbox"/> Automotive Technician | <input type="checkbox"/> Drafting—Machine Trades | <input type="checkbox"/> Plumbing—Practical |
| <input type="checkbox"/> Better Foremanship | <input type="checkbox"/> Electrical Engineering | <input type="checkbox"/> Private Secretary |
| <input type="checkbox"/> Blueprint Reading | <input type="checkbox"/> Electricity—Practical | <input type="checkbox"/> Retail Merchandising |
| <input type="checkbox"/> Bookkeeping | <input type="checkbox"/> Electronics—Industrial | <input type="checkbox"/> Salesmanship—Outside |
| <input type="checkbox"/> Business Management | <input type="checkbox"/> HIGH SCHOOL COURSES | <input type="checkbox"/> Sheet Metal Work |
| <input type="checkbox"/> Civil Engineering | <input type="checkbox"/> Machinists | <input type="checkbox"/> Tool Making |

NAME..... OCCUPATION.....
HOME ADDRESS..... AGE.....
CITY..... STATE.....

MAIL COUPON NOW



Coming in May



Popular Science: 12 page bonus booklet, "Take-Along Checklist for Judging a Used Car"

Here, in one take-along booklet, are hundreds of simple, nearly foolproof checks you can apply when shopping for a used car. Let May POPULAR SCIENCE's unique scoring system show you how to find your best used-car buy. Learn how to check for leaks, hidden rust, old paint jobs, etc.; how to check the body—doors, hood, trunk, handles, glass, chrome, etc.; how to judge tires, suspension, chassis, upholstery, etc.; how to check the motor while off, idling and on the road; how to check brakes, steering, clutch, standard and automatic transmissions, rear axle, wheels, frame, instruments, etc.; how to re-check *after* road test; plenty more. All yours in a handsome, 12-page, removable booklet in May POPULAR SCIENCE.

also

TIMETABLE TO THE MOON—When will man land on the moon? According to Dr. I. M. Levitt, Director of Philadelphia's Fels Planetarium, man will approach the moon in five distinct steps. One of these steps will be the explosion of an A-bomb on the moon for scientific purposes. This, says Dr. Levitt, will happen within five years, and will help man reach the moon by the year 2000. For the fascinating facts on each of the five steps, be sure to see May POPULAR SCIENCE.

HOW TO PASS TESTS—With tests becoming more and more important in getting good jobs in government and big or small business, this May POPULAR SCIENCE feature could well be one of the most valuable you have ever read.

Learn how to increase your grades on information or aptitude tests; tips for better marks on essay-type questions; priceless know how for short-answer tests including true-false, multiple choice, matching, etc. A real eye-opener in May POPULAR SCIENCE.

NAVY'S DEADLY NEW MISSILE—An exciting feature on Polaris, our new intermediate-range ballistic missile capable of being launched from a submerged submarine and hitting a target 1,500 miles away. . . . A report on two cars with a Swedish accent—Saab and Volvo. . . . A peek at the automotive miracles of tomorrow, including automatic highways and electronic anti-collision devices. . . . A giant roundup of 1958 outboard motors with a chart of fully detailed specifications for each. . . . A valuable "under the hood" story on car engine tune-ups . . . and more.

Get May Popular Science—At all newsstands, soon!

Be Your Own Boss in the Profitable Excavating Business!

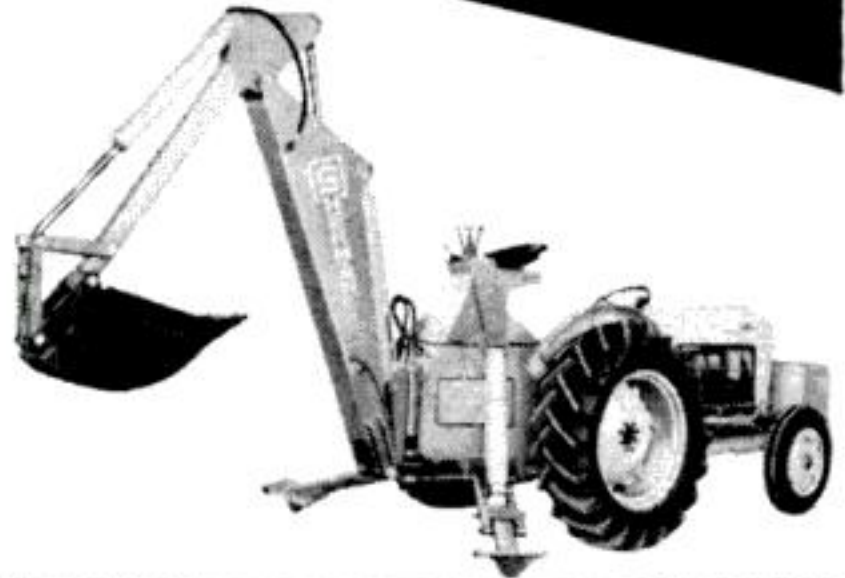
EARN UP TO \$1,000 AND MORE PER MONTH

Wherever you live, you'll find plenty of profitable work the whole year 'round for this versatile outfit . . . not just a "trencher" but an all-purpose excavating machine! Custom operators everywhere are making big money with Sherman Power Diggers. ONE BOUGHT A FARM WITH JUST THREE YEARS' PROFITS! Work for builders, contractors, utilities, and municipalities on such jobs as septic tanks and drainfields, sewer lines, fuel tank installations, foundations and footings, gas and water lines, field tilling and many others. The Sherman Power Digger mounted on a Ford Tractor travels quickly from job to job, digs at a fraction of the cost of manual labor. It's simple to operate, easy to maintain, built to last.

Send now for information about the easy-to-get jobs for your Sherman Power Digger. Let us tell you—without obligation—how you can go into business for yourself with an investment of less than \$5000. Or make a small down payment and pay the balance from earnings.

SHERMAN PRODUCTS, Inc.

Dept. 4936R Royal Oak, Michigan



Send Now for FREE LITERATURE!

Sherman Products, Inc.
Dept. 4936R — Royal Oak, Michigan

Send me information on how I can get into the excavation business on my own.

NAME _____

ADDRESS _____

CITY _____ STATE _____

"We Have No Rent to Pay." That is Why We Can Sell For Less.
24 YEARS IN BUSINESS AT THE SAME ADDRESS.



FREE

GUARANTEE BOND given with each used tire sold. We guarantee the amount of service you pay for. SEND AD.



EVERYBODY MAY DEDUCT 10% off ON EVERY TIRE

PRICES SHAVED TO THE BONE—6 Mos. Guar.—W.W. \$1.00 Ex.
600x16 \$3.55 670x15 \$3.85 700x16 \$4.35 760x16 \$4.75
650x15 3.75 800x15 4.75 710x15 4.25 820x15 4.85
650x16 4.15 700x15 3.85 760x15 4.35 550x17 4.55

12 MOS. WRITTEN GUARANTEE.		WHITE WALLS \$1.00 EXTRA	
600-16 \$5.15	475-19 \$5.3	700-15(6) \$8.75	700-20 \$11.95
600-16(6) 6.45	640-15 4.95	750-16(8) 9.95	750-20(10) 14.95
650-16 5.45	670-15 5.25	700-17 10.85	750-20(8) 10.95
650-16(6) 6.45	710-15 5.35	750-17 12.75	825-20 18.55
700-16 6.25	760-15 5.45	600-20 9.65	900-20 18.75
750-16(6) 7.45	800-15 5.75	650-20 10.75	1000-20 19.75
550-17 4.75	820-15 5.75	32x6(8) 10.35	1100-20 19.75
650-15 5.25	670-16 5.65	32x6(10) 12.35	1000-22 20.95
700-15 5.35	700-16(6) 7.75	750-15 11.95	1100-22 20.75

Thousands of tires shipped all over the U.S.A. All tires shipped F.O.B. Phila. Send Check or M.O. with this ad. Dept. 5. No C.O.D.

STANDARD 834 N. Broad St., Philadelphia 30, Pa.

PREPARE FOR THE BEST JOBS IN INDUSTRY

**STUDY
AT
HOME**

in your spare time
or at
ALLIED INSTITUTE
Chicago 5, Illinois

- Drafting—ALL BRANCHES
- Tool & Machine Design
- Tool Engineering [Bachelor Degree TE]
- Mech. Engineering [Bachelor Degree ME]
- Master Machinist
- Tool & Die Making
- Auto Mechanics
- Air Conditioning
- Refrigeration

MORE JOBS THAN GRADUATES

Soon after starting many ALLIED students begin to make good extra money in their spare time. Your Home Training may entitle you to two weeks of training at the great ALLIED shops at no additional tuition cost, should you desire it. Students planning a career in engineering can begin their training in short courses at Home or at Allied Institute, and continue progressively toward an engineering degree in 31 months. ALLIED is approved by industry. National Home Study Council. Dept. of Education, Office of Public Instruction, State of Illinois.

**SEND FOR
FREE
BOOKS**

Allied Institute of Technology, Div.
Allied School of Mechanical Trades
1338-42 South Michigan Ave., Dept. PS-48, Chicago 5, Ill.

Send me without obligation information on your courses:

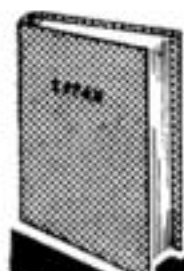
- | | |
|--|--|
| <input type="checkbox"/> Drafting—All Branches | <input type="checkbox"/> Master Machinist |
| <input type="checkbox"/> Tool & Machine Design | <input type="checkbox"/> Tool & Die Making |
| <input type="checkbox"/> Tool Engineering | <input type="checkbox"/> Auto Mechanics |
| <input type="checkbox"/> Mech. Engineering | <input type="checkbox"/> Air Conditioning |
| <input type="checkbox"/> Refrigeration | |

☐ HOME STUDY ☐ RESIDENT ☐ VETERAN ☐ NONVETERAN

NAME _____

ADDRESS _____

CITY _____ COUNTY _____ STATE _____



LEFAX TECHNICAL DATA BOOKS POCKET SIZE • LOOSE LEAF

Printed on loose leaf, 6 hole, 6 3/4"x3 3/4" bond paper, each book contains about 140 pages of technical data, condensed, accurate, essential, for engineer, technical worker, teacher, student, business man. **\$1.25 each**

Architecture	Surveying	Mech'l Drawing	Metallurgy
Home Heating	Surveying Tables	Machine Design	Hydraulics
Illumination	Highway Eng'g.	Machinist's Data	Radio
Electrician's Data	General Math	Mech. of Materials	Television & FM
Builder's Data	Math Tables	Pwr. Trans. Mach.	Electricity, AC
Lumber Data	Physics	Thermo. Tbls. & Charts	Electricity, DC
Air Conditioning	Trig-Log Tables	Phys. & Thermo. Data	AC Motors, Gens.
Building Constr.	Gen'l Chemistry	Conversion Tbls.	Welding Data
Reinf. Concrete	Chemical Tables		Transformers,
Piping Data	Analytic Chem.		Relays & Meters

Write for FREE catalog (2000 listings). See how helpful LEFAX can be to you. Send \$1.25 book, or \$6 for any five books to

LEFAX PUBLISHERS, Dept. PS-48, PHILADELPHIA 7, PA.

ENGINEERING

Home Study Courses

CCOURSES written by world authorities in all branches of engineering. Step-by-step instructions using methods proved successful by thousands of our graduates. One hour each day in your spare time will start you off to higher pay, security, prestige. Check the course you are interested in and we will send you a complete outline of the course with a booklet describing the Institute and our advanced methods of teaching. Send to: Canadian Institute of Science and Technology Ltd., 680 Century Bldg., 412, 5th St. N.W. Wash., D.C.

Civil Eng.
Surveying
Architecture
Forestry
Mining
Structural
Mechanical Eng.
Industrial Eng. & Management
Refrigeration
Heating
Drafting
Plastics
Electrical Eng.
Radio
Electronics
Television
Aeronautical Eng.
Aircraft Engineer
Navigation
General Education
Chemical
Mathematics
Journalism
Accounting

NAME.....

ADDRESS.....

CITY..... STATE.....

Course Interested In.....

Canadians: Send to Canadian Institute of Science & Technology Limited, 680 Garden Bldg., 263 Adelaide St. West, Toronto, Ontario.

Become A - - - BUILDING CONTRACTOR!

MAIL COUPON for FREE BROCHURE

Simplified home study training program. Learn every phase of building, estimating, contracting. Fortunes are made in this line of work every year. Use spare hours—no interference with present work. Diploma awarded. Low tuition rates.

AMERICAN TECHNICAL SOCIETY
Dept. PS-458, 850 E. 58th Street, Chicago 37, Ill.
Please send me your FREE Brochure and full details of your building, estimating and contracting training program.

Name.....

Address.....

City..... State.....

MAKE STRIPES with new PAINT PEN

Straight, curved, single or double
With any color paint, stripe furniture, bikes, autos, model planes, toys, linoleum, wall-board. Clean, crisp decorative lines. Can't clog or smear. Also use with glue, tempera, textile paint or underglaze... on wood, glass plastic, ceramics, metals, fabrics and paper. Ask your dealer or order direct.

DEALERS Master paint striping tool in display carton. Write for discounts. Order now.
HOBBY "Professional" results every time. Simple, easy to use.
MFRS Ask about heavy duty industrial striping tools.

DOUBLE STRIPE MODEL \$3.25
5 COMBINATIONS.

Single 1/16" stripe model \$1.25

Other single \$1.75 stripe models
1/64", 1/32", 3/64", 5/64", 3/32" & 1/8"

Complete Kit \$5.00
(all 7 tips)

Extra tips 90c ea.

Extra 1/4" tip..\$1.20

WENDELL MFG. CO.

4234 LINCOLN AVE., Dept. 240
CHICAGO 18, ILLINOIS

NEW SIMPLEX

MODEL 400 LAWNMOWER SHARPENER

Offers These Big Advantages:

- Grinds All Types of Mowers
- No Dis-assembly Needed
- Feeds Horizontally—Vertically
- Head Turns 90° for Bed Knives
- Fast, Positive Adjustment
- Rugged-duty Construction



Send For Free Brochure Today

The Fate-Root-Heath Company • Dept. PS-4 • Plymouth, Ohio

TV DAN, THE MUSCLE MAN



GUARANTEES TO BUILD YOUR MUSCLES FAST!

IN 6 WEEKS OR MONEY BACK
You can have tremendous power, look bigger, have more confidence this tested way. Revolutionary new "Body Mold" courses builds your body in a way no other method can match. Get course FREE with order. Lowest factory price.
DAN LURIE BARBELLS
50 lb. set \$ 8.98 • 100 lb. set \$14.98
150 lb. set \$21.98 • 200 lb. set \$27.98
Extra Wts. — 14c per lb. 50% cash, balance C.O.D. FOB Plant
DAN LURIE BARBELL CO.
52 S-4 Bristol St., Dept. 770-D Bklyn 12, N.Y.

FREE! SEND FOR NEW SPORTS & HEALTH CATALOG

Would You Like to Make **\$1,000 A MONTH?**



That's what Stanley Hyman made selling the amazing new Presto Fire Extinguisher! Many others "cleaning up"—so can you! Amazing tiny new extinguisher ends fires fast as 2 seconds. **Guaranteed for 20 years!** Sells for only \$4.95. Write for Free sales kit.



Merlite Industries, Presto Div.,
114 E. 32nd St., Dept. P-16H, New York 16, N. Y.

SIGN PAINTING

Home-Study Course—Only \$5.95

Teaches you commercial sign painting and sign building as it is being done TODAY in leading shops all over the country. Complete practical course for self-instruction. Shows latest methods of truck lettering, office doors, wood letters, reflecting signs, plastics, sprayed signs, gold leaf, silk screen process, up-to-date alphabets, money-making business information, etc. **SATISFACTION GUARANTEED OR REFUND!** Contains all the instruction of a high-priced correspondence course. Full price, only \$5.95, postpaid. Or C.O.D. plus postage. No risk—order today. Satisfaction or money back! Order "Sign Painting Course."
NELSON-HALL CO., 210 S. Clinton St., Dept. DS-1, Chicago 6, Ill.



BOAT PLANS-PATTERNS FRAME KITS

A modern up to date series of inboard and outboard designs for the amateur builder. State specific size and type or send 50c for BIG NEW CATALOG.



marine **GLEN** designs

9152-P Rosecrans, Bellflower, Calif.

ELECTRONIC AND AERONAUTICAL ENGINEERING TECHNOLOGY

★ TWO YEAR COURSES ★

Northrop Institute in Southern California prepares you for highly paid positions in Aviation and Electronic Industries. Employment assistance during school and after graduation. Approved for Veterans.

Write today for FREE CATALOG

NORTHROP AERONAUTICAL INSTITUTE
1157 W. Arbor Vitae • Inglewood 1, California

THROW OUT



Model No. 520
20"x8 1/2"x13"

Model MC-28
28"x9"x8"

These famous Kennedy tool chests in brown, ripple baked enamel. See them at your dealer's NOW.

Write For Name of Nearest Dealer

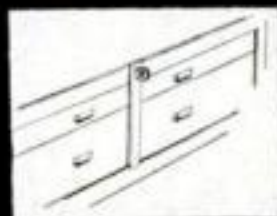
DEPT. PS-4

YOUR OLD CHEST for a new **KENNEDY** journeyman

- 7 lined drawers, top storage, heat- and moisture-proof
- Rugged steel construction . . .



Compound
Drawer Slides



Bar
Lock

benchmark

- Machinist chest designed as a base for the JOURNEYMAN
- Large enough to hold 24" scale and 1/4" drill



Kennedy Manufacturing Company
Van Wert 2, Ohio



Model K-1

AUTO-CRAFT, INC.

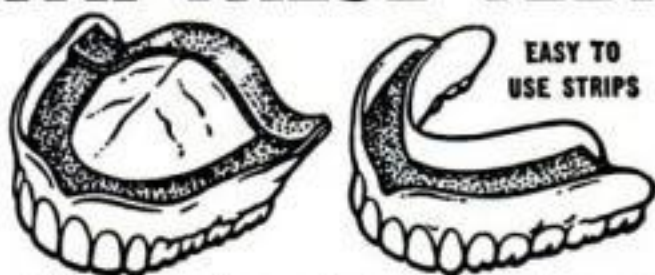
Starter Kits from
\$199⁹⁵*

America's Newest
Junior Sports Thrill!
1/4 MIDGET RACERS
and educational cars

For children 4 to 14. Completely safe to operate. Starter kit includes frame, wheels, tires, tubes, axles, steering wheel. Complete deluxe cars from \$299.95 to \$499.95. Get FREE brochure packed with pictures, special prices. Write today. Immediate delivery on all cars. *Complete Cars from \$299.95

Box 231 • 1301 East 4th St.
HUTCHINSON, KANSAS

EAT ANYTHING WITH FALSE TEETH



EASY TO
USE STRIPS

Trouble with loose plates that slip, rock or cause sore gums? Try Brimms Plasti-Liner. One application makes plates fit snugly without powder, paste or cushions. Brimms Plasti-Liner adheres permanently to your plate; ends the bother of temporary applications. With plates held firmly by Plasti-Liner, **YOU CAN EAT ANYTHING!** Simply lay soft strip of Plasti-Liner on troublesome upper or lower. Bite and it molds perfectly. Easy to use, tasteless, odorless, harmless to you and your plates. Removable as directed. Money-back guarantee. At your drug counter. \$1.50 reliner for one plate; \$2.50, two plates.

Special Offer! Free 35¢ package of Tri-Dent Brushless Denture Cleaner. Send only 10¢ for postage and handling. Offer expires May 31, 1958. Plasti-Liner, Inc., Dept. AZ, 1075 Main St., Buffalo 9, N. Y.

BRIMMS PLASTI-LINER
THE PERMANENT DENTURE RELINER

Free! SCARCE TRIANGLE COLLECTION



Start TODAY to enjoy an exciting new hobby! Get this big, valuable collection of gorgeous, multi-colored triangle shaped postage stamps . . . brought to you from strange and mysterious lands in the wilds of Africa, enchanting Europe, exotic Latin America, etc. All genuine, all different—picturing man-eating reptiles, jungle birds, action-packed sports, ancient clipper ships; **PLUS** scarce airmails, fabulous commemoratives, giant and midget-sized stamps. **EXTRA!** Bargain Catalog, "Collector's Manual" plus other exciting offers for your inspection. Enclose 10c for mailing costs. Supplies limited. **ACT NOW!**

JAMESTOWN STAMP CO. DEPT. H48P5 JAMESTOWN, N.Y.



RUSH my Free "Triangle" Collection and other offers. I enclose 10c for mailing costs.

Name.....
Address.....
City &
State.....

Dr. Grabow PRE-SMOKED PIPES

Cool, sweet and mild
from the first puff.
No breaking-in
because they're
mechanically
pre-smoked.



Imported
briar
\$3.50
other Dr. Grabows
from \$1.50 to \$10
♠ trademark of quality
For informative booklet write:
Dr. Grabow Pipe Co., Greensboro, N.C.

FREE! CHEMISTRY

Wouldn't you like to enroll for a complete course in Chemistry, earn a valuable Diploma, and not pay a cent for the whole thing? Then don't delay; send today for free catalog describing 18 fascinating Chemistry courses, laboratory equipment and instruments, all of which may be yours without cost if eligible! **FREE** chemical tester if you answer now! **NATIONAL SCHOOL OF CHEMISTRY, Redwood City, Calif.**



NOW The Short Cut to Learning You've Been Waiting for



LEARN "BY EAR" WITH THE DORMIPHONE

A Scientific Discovery that Works
for You . . . Awake and Asleep

Now, at last, an easy shortcut to learning. With this amazing new tool, you "start" to learn while awake—then the Dormiphone takes over while you go off to sleep. Do you want to learn a language—memorize a speech, facts, figures, formulae—correct your speech—break bad habits? The Dormiphone

SAVES YOUR TIME—EFFORT. Simple—helpful—practical. Used by educators, psychologists, people of all ages, occupations. Find out HOW the Dormiphone works. Write for **FREE** Book—Get the Scientific Evidence NOW.

MODERNOPHONE, INC., 262-048 Radio City, New York 20, N.Y.
Gentlemen: Please send me your **FREE** Book—no obligation.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

My main interest in Dormiphonics is for:

- | | |
|--|---|
| <input type="checkbox"/> Language Learning | <input type="checkbox"/> Speech Improvement |
| <input type="checkbox"/> Memorization | <input type="checkbox"/> Sleep Inducement |
| <input type="checkbox"/> Habit Correction | <input type="checkbox"/> School or College Work |

Just Like
The Cowboys

AUTHENTIC—FULL LENGTH

BULLWHIP

SNAP

MAKE YOUR OWN—SAVE MONEY

Get this rugged 8 strand Indian Tan rawhide leather Bull Whip and enjoy the excitement and skill of whip popping! Professionally cut in one continuous piece of leather, gives added strength and long life.

EASY step-by-step illustrated instructions that makes plaiting fun to do!

KIT COMPLETE—Order today:

6 FT. BULL WHIP . . . \$3.95 ppd.

8 FT. BULL WHIP . . . \$4.95 ppd.

FREE 100 PAGE CATALOG

TANDY LEATHER CO.

P. O. Box 791-FD

Fort Worth, Texas



HOW TO GROW

ORCHIDS

AT HOME

"Most enjoyable hobby I know. People drove 100 miles to see this plant . . . 10 flowers 8 1/2 inches across."
THOS. HURST, Utah

Learn Special Conditions of Light, Temperature & Humidity Needed

WORLD'S MOST THRILLING HOBBY—SUCCESSFUL HOME GROWER offers **COMPLETE** illustrated instructions. Tells **HOW TO START**. Explains everything you need to know about growing Cattleyas, Cymbidiums, Odontoglossums and others. Many Orchids **GROW WITHOUT SOIL**, get food from the air. Instructions include real **BLOOMING-SIZE ORCHID PLANT. FREE**—full details. **WRITE TODAY!** **TROPICAL FLOWERLAND, Dept. 24A, 100 S. Vermont, Los Angeles 4, Cal.**

Hundreds of Families Growing Orchids at Home with Our Help.



SIGHTING SCOPE

Gov't Surplus—Guaranteed Perfect.

- Built-in light for night sighting. (Takes 2 ordinary flashlight batt.)
- Built-in mountings. • 5 1/2" long.
- Weight 1 lb. • Solid brass.
- 1.44x used mainly for sighting.

Objective lens is at small end.

Achromatic coated prismatic lenses ideal for: Telescopes, Target -potting, Hunting, Surveying, Convert to erect microscope.

JOB LOT TRADING CO. 53 VESEY ST. NY 7, NY



\$4.95
ppd.

No COD's
Gov't
Cost
\$70



Now!

TEST YOUR OWN TV & RADIO TUBES

for filament breaks

all of them—even picture tube

Nearly half of TV service calls are due to defective filaments. Tester shows if filaments are good. Insert tube in tester. Light shows if tube is burned out. Easy, safe. One service call saved pays for tester. Metal case, AC or DC. Checks fuses, appliances, etc. Only \$3.95 ppd. or C.O.D. plus charges. Deluxe Model \$4.95. Instructions. Guaranteed.

GEIGER ENGINEERING CORP.
3738 West Lawrence Avenue
Dept. BC-108 Chicago 25, Ill.

JEEP OWNERS

RE-POWER NOW with a V-8 engine—Use

FORD • CHEVROLET • MERCURY

in 2 or 4 Whl-Dr. Jeeps, Jeepsters, Sta-Wgn, Trucks, H.J. and Kaiser cars. Conversion Kits \$43.25 to \$59.85. If you want fast action tell us which engine you wish to use, give us year, Model, (2 or 4 Whl-Dr), of your vehicle. Send Min. \$15.00 Dep. and we will ship correct kit, Bal. COD. Send full amt. for Prepaid shipment. Wire, phone or write for free details. (Also kits for Ford 6 engine.)

HOOSIER MACHINE PRODUCTS CO.

314 S.E. 6th St.

Phone CR6-3442

Pendleton, Oregon

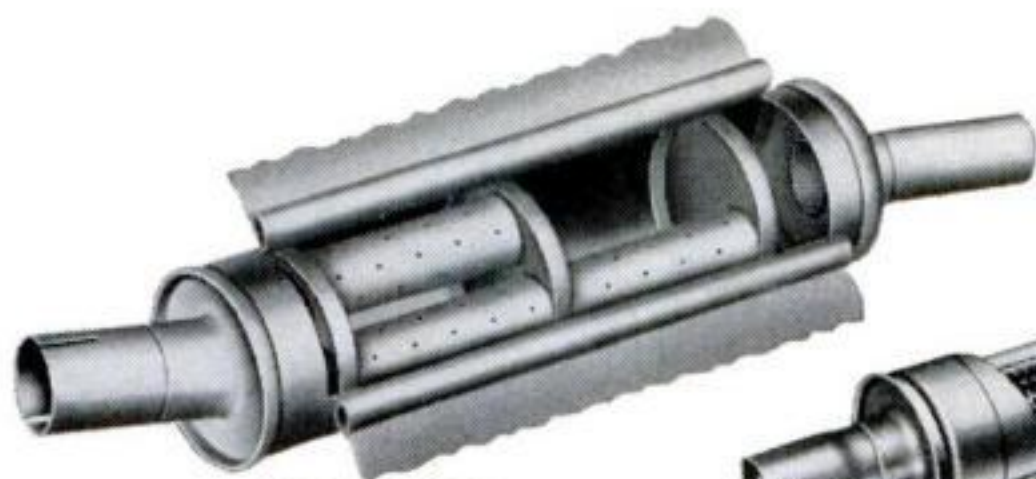
WARN HUBS ON YOUR Jeep

STOP FRONT DRIVE WEAR



Over 100,000 Warn Hubs are now in use, **proof** that free-wheeling 2-w.d. with Warn Hubs means big savings in gear, engine, tire wear, gas, plus more pep, performance, power in high and easier steering. Now, with Warn Lock-O-matics, you have economical, drag-free 2-w.d. or tractive 4-w.d. automatically, as you shift! Ask your local 4-w.d. dealer to install Warn Lock-O-matic or Locking Hubs today. Fully guaranteed. Write for free literature.

WARN MFG. CO., Riverton Box 6064-B-4, Seattle 88, Wn.



ENGINEERED



OR GLASS-PACKED

For that unique sound of POWER

DYNATONE NOW OFFERS YOU TWO GREAT MUFFLERS

.....

No muffler can give your car the special sound of a Dynatone. And *now* you can choose from *two* sensational Dynatone styles. Each has its own distinctive voice. Choose the deep, mellow sound of the engineered Dynatone. Or you may prefer the smooth, off-key purr of the new Dynatone Glass-Packed. It features straight-through design with a big 2-in. inner pipe for power and two kinds of glass packing to trap high frequencies and let through only the power tones.

Take your pick. Both cut power-stealing back pressure to a minimum. Both give you finer performance, better operating economy, and the thousands of miles of *extra* service you always get with Dynatone.

AT YOUR FAVORITE DEALER OR
AUTOMOTIVE STORE

DYNATONE®

Dept. 4D, Toledo 1, Ohio

RUPTURED

BE FREE FROM TRUSS SLAVERY

Surely you want to **THROW AWAY TRUSSES FOREVER**, be rid of Rupture Worries. Then Why put up with wearing a griping, chafing and unsanitary truss. For there is now a new modern Non-Surgical treatment that is designed to permanently correct rupture. These Non-Surgical treatments are so certain, that a Lifetime Certificate of Assurance is given.

Write today for our New **FREE** Book that gives facts that may save you painful, expensive surgery. Tells how non-surgically you may again work, live, play, love and enjoy life in the manner you desire. There is no obligation.

Excelsior Hernia Clinic, Dept. 3705, Excelsior Spgs., Mo.

FREE LAFAYETTE CATALOG

JUST OFF THE PRESS!

NEW 180 PAGE ELECTRONIC CATALOG FEATURING
THE BEST BUYS IN THE BUSINESS

Packed with the largest selection of Electronic, Radio and T.V. Parts, and equipment, PA, Hi-Fi systems, tubes, antennas, Transistor Kits, parts and components, Test Equipment, new build your own kits, tools, books, Microscope, drafting equipment, Binoculars, Telescopes, All Radio, TV and Ham supplies—**ALL AT GREAT SAVINGS**—For the economy minded servicemen, dealer, engineer and technician. **CHUCK FULL OF BUYS! SEND FOR YOUR FREE COPY TO-DAY.**



Name _____

Address _____

City _____

Zone _____

State _____

Lafayette Radio

165-08 LIBERTY AVE.
JAMAICA 33, N. Y.

Dept. KD



LEARN TO

OPERATE EARTH MOVING EQUIPMENT

Men who "boss" crawler tractors, front end loaders, motor graders, cranes, etc., earn top pay on construction, road building, excavating & other jobs. 4 week courses on motor graders and compactors \$295; bulldozers, trucks, loaders & scrapers \$375; backhoe & dragline operation \$320; dump, trailer dump & off-highway truck course \$180; 7 week combination course \$560—All courses include preventive maintenance—Special weekend instruction available—50 miles from Chicago—Economical housing & board—Write for details NOW.



OR LEARN TO BE A CONSTRUCTION EQUIPMENT

MECHANIC

Greer also teaches a complete, separate, Mechanics Training Course covering Diesel engine transmissions; torque converters; fuel injection systems; track assemblies; final drive assemblies; steering systems; idlers; rollers; power transfer systems; cable control systems; hydraulic control cylinders & welding pertaining to heavy equipment such as bulldozers, scrapers, loaders, off-highway trucks, etc. Course time—540 hours—18 weeks—\$540. Write for details.

Please send **FREE** information on

☐ **HEAVY EQUIPMENT OPERATORS TRAINING**

☐ **CONSTRUCTION EQUIPMENT MECHANICS TRAINING**

NAME.....AGE...

ADDRESS.....PHONE.....

CITY.....STATE.....



Greer

TECHNICAL INSTITUTE

ATT. P-D. Hutchison, Box 278, Braidwood, Ill.

New HOME-IMPORT BUSINESS



Famous World Trader Shows You How To Buy Below Wholesale

MAKE BIG PROFITS on thousands of exotic imports. No experience or investment in products needed. Proven formula guides men and women . . . shows you how to pocket profits in advance, how to get products for full or spare time home Mail Order Business.

Open cash orders, take out the money, deduct your profits, then have the imports shipped direct from abroad. **NO STOCKS TO CARRY** on new plan, no face to face selling. Or handle volume orders for wholesalers, gift or department stores, etc. Export opportunities also.

FREE SAMPLES—CONTACTS ABROAD

Following our plan you receive free, 8 imports—and membership in International Traders which provides you with monthly bulletins revealing foreign products with names and addresses of overseas suppliers.

HUGE UNCROWDED OPPORTUNITY

Each year more imports are offered in U. S. and snapped up by mail order and store buyers alike. And the word "imported" is like magic to the millions who want new, rare, romantic and unusual gifts at big savings. And there seems to be no end to this demand. Others using our plan are now importing at low foreign costs products that sell here at handsome profits. Why not you?

GET FULL DETAILS—ALL FREE!

There's no obligation whatever. No salesman will call on you. Air mail reaches us over night. Write today.

EXAMPLES OF LOW PRICES ABROAD

THE MELLINGER CO.
1717 Westwood Blvd., Dept. P244,
LOS ANGELES 24, CALIF.

TEST TV & RADIO TUBES Yourself Safely in Seconds!



with New 1958
**ELECTRONIC
DETECTOR!**

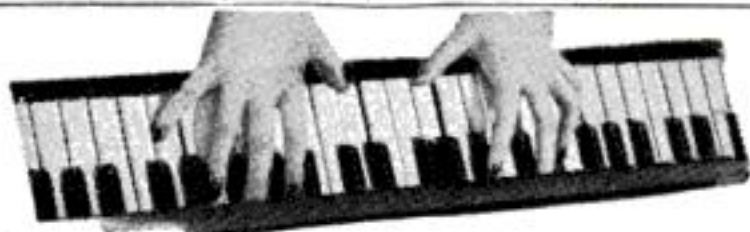
3⁹⁸

- ★ Checks BIG Picture Tube too!
- ★ Localizes Broken Filaments!
- ★ Pays for Itself First Time Used!
- ★ Safe! Quick! Easy! Foolproof!

Most TV failures are due to burned out tubes. Save repair calls! Check tubes yourself with Electronic Detector. Safe! Easy! No technical

knowledge needed. Check motors, appliances, etc. AC & DC. Reg. model \$3.98; DeLuxe (with cover) \$4.98. Money back guarantee. Order direct:

THORESEN, Inc., Dept. 7-D-124, 585 Water Street, New York 2, N. Y.



Play Right Away!

ANY INSTRUMENT

Now it's EASY to learn ANY INSTRUMENT—even if you don't know a single note now. No boring exercises. You play delightful pieces RIGHT AWAY—from very first lesson! Properly—by note. Simple as A-B-C. You can make amazing progress—at home, in spare time, without teacher. Only few cents per lesson. 900,000 STUDENTS including Lawrence Welk. (60th successful year).

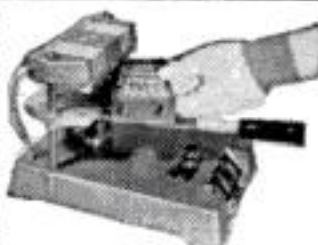
FREE BOOK Shows how easily you can learn music. Write for it. No obligation; no salesman will call. U. S. SCHOOL OF MUSIC, Studio 154, Port Washington, New York.



56 POPULAR SCIENCE

New Table Top Invention Puts You In... PROFITABLE RUBBER STAMP BUSINESS

Home Operators now make \$9.40 AN HOUR in business once monopolized by a few big companies



Special rubber stamps bring high prices—cost only pennies to make on new, low-cost table top machine. Take 27 cents worth of material, make perfect stamps, the kind businesses and offices now buy by the dozen at \$1.80 each. Make up to \$9.40 an hour. Start in spare time in your own home. Run machine on kitchen table using ordinary electrical outlet. Make any kind of stamp. We'll send you free information without obligation about this established, highly profitable business, now open to individuals for the first time. For free information send name today on a post card to Rubber Stamp Div., 1512 Jarvis Ave., Dept. R-3-D, Chicago 26, Ill.

EXCLUSIVE DOUBLE-BEARING HEAVY DUTY PUMPS



IRRIGATE • DRAIN • CIRCULATE • SPRAY
Use 1/4 HP motor or larger . . . 1 HP for up to 7,500 GPH; 1,000 GPM 60' high; or 3,000 GPH from 25' well, 1 1/4" inlet; 1" outlet. Stainless shaft, TYPE X—2 oil-less bronze bearings. Won't rust. **\$10.95**
TYPE XB—Ball bearing model. Best for belt drives. **\$12.95**
Postpaid if cash with order. Don't delay—send for yours today!
MONEY BACK GUARANTEE
Centrifugal and Gear Pumps in All Sizes
LABAWCO PUMPS, Belle Mead 4, N. J.

READING GLASSES that MAGNIFY



WEAR THEM ON 10-DAY TRIAL
For those who need simple magnifying glasses only. Mighty helpful for most people over 40.

SEND NO MONEY

FREE CASE

Just name, address, sex, age. When glasses arrive, pay postman \$2.95, plus small C.O.D. charge. Or send check or M. O. now for \$2.95 and we pay postage. **SATISFACTION GUARANTEED**, or purchase price refunded promptly.

MODERN LENS CO., P. O. Box 92, Cooper Sta., N.Y.C. 3

GOVERNMENT OIL LEASES LOW AS \$1 PER ACRE.

You do no drilling, pay no taxes, may realize a king-size profit without ever leaving home. Write for free map and literature.

AMERICAN OIL SCOUTS, Dept. PS
7321 Beverly Blvd. Los Angeles 36, Calif.



\$2.95 OR 2 FOR \$5.00

TESTED AND GUARANTEED

Write for free list on all types of telephones. Shipments F.O.B. Simpson, Pa.

TELEPHONE ENGINEERING CO.
Dept. 4A8 Simpson, Pa.

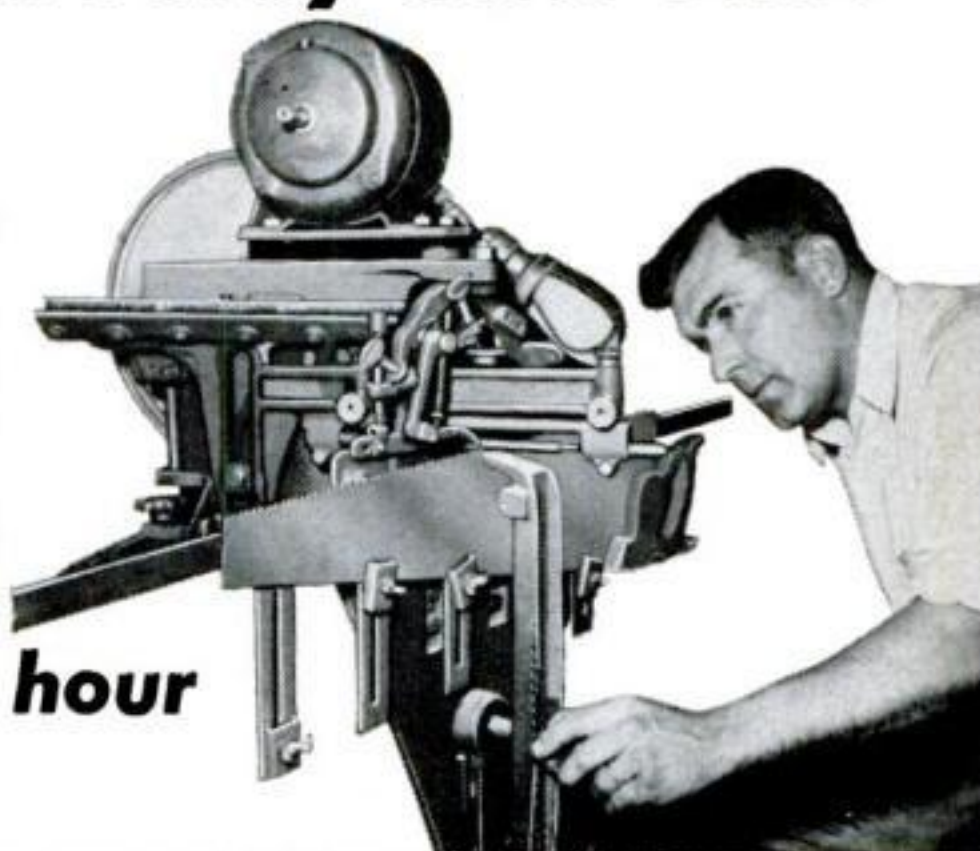
SURPLUS SALE OF HAND TACHOMETERS

Used by mechanics, engineers and maintenance men. Very accurate. Registers 0- to 10,000 RPM. Government acquisition cost approximately \$100.00 each. Our price, New \$34.95, slightly used \$19.95, postpaid; limited quantity.

NATIONAL ELECTRIC & MFG. COMPANY
P.O. Box 2099 East Highway 80, Abilene, Texas



"WE PAID FOR OUR HOME with a Foley Saw Filer"



Here is the true story of Leslie Patrick—as told by his wife, who wrote us about their success in a town of 12,000.

"I can truthfully say that when Mr. Patrick got his Foley, he made a good and wonderful investment. When we moved here in March, 1946, we had only a Model A Pickup and all our belongings were in it. Since then, my husband has done so well with his Foley Saw Filing Machine and repair shop that we bought a house and paid for it and have two nice boys; bought a new car and built an addition to our house; and he has got a lot of new machines in the shop that a person needs in business. Nicest of all, it is all paid for."

Make up to \$3 or \$5 an hour

With the Foley Automatic Saw Filer you can sharpen hand, band, and circular saws just like new. Start in spare time, in your garage or basement. No experience needed. Build

up a steady, repeat CASH business which will buy YOU a home or new car. Send coupon for FREE BOOK—"Money Making Facts". No salesman will call.



FOLEY MFG. CO., 419-8 Foley Bldg., Minneapolis 18, Minn.

Send Free Book "Money Making Facts".

Name _____

Address _____

WORLD'S LOWEST PRICED ADDING MACHINE

COUNTS UP TO 999,999,999
IDEAL FOR BUSINESS AND PERSONAL USE—GUARANTEED ACCURATE. Not a toy. Operates with only a finger flick. Adds, subtracts, multiplies, divides. Counts up to one billion. Pays for itself over and over. Ideal Gift—for Business, Income Tax and School use. **MONEY BACK GUARANTEE.** Send name and address. Pay postman only \$2.95 plus postage. Beautiful rich-looking Leatherette Case included at no extra cost. Money back in 10 days if not delighted. **AGENTS WANTED.**
CALCULATOR MACHINE CO., (Mfrs.)
Box 126 Dept. A-82, Huntingdon Valley, Pa.

Vest Pocket
Size
FREE TRIAL

\$2.95

\$3.04
In Penna.
Incl'g.
3% Tax



SAVE \$10.00



NORELCO "Speedshaver" Men's Electric Shaver. Latest model, brand new and fully guaranteed. Complete with case, cord and cleaning brush. Regularly retails at \$24.95. Our price \$14.95 postage pd. All orders filled within 24 hours. Your money back if you are not fully satisfied. Send check or money order to:
JOHN BROOKS, Dept. 985, Box 212, St. Louis 3, Mo.

SEWS LEATHER AND TOUGH TEXTILES LIKE A MACHINE

With SPEEDY STITCHER Automatic Sewing Awl, anyone can quickly and skillfully sew or repair anything made of LEATHER, CANVAS, NYLON, PLASTIC, or other heavy materials. Sews firm, even lock-stitches like a machine. Gets into hard-to-reach places. Specially made for heavy duty sewing on LUGGAGE, FOOTWEAR, RUGS, AWNING, SAILS, SADDLERY, UPHOLSTERY, OVERALLS, AUTO-TOPS, SPORTS GEAR, and other tough sewing jobs. Here's the handiest tool you'll ever own. Will save you many times its small cost. Comes ready for instant use... complete with bobbin of waxed thread and 3 different types of diamond-pointed needles. Easy-to-follow directions will make you an expert in minutes. Extra needles and waxed-thread always available. Save money, send \$1.98 for post-paid delivery. If C.O.D., \$1.98 plus postage. **MONEY BACK GUARANTEE.**



SPORTSMAN'S POST

366 Madison Ave., Dept. A-54, New York 17

ONLY

1.98

TRAINED MEN NEEDED!

**IN INDUSTRY—ARMED FORCES
BIG PAY!—GOOD FUTURE!**

☐ DIESEL ☐ ELECTRONICS
☐ AUTO ☐ AUTOMATION

NEVER BEFORE has the opportunity been so good for the properly trained mechanic and technician to step into BIG PAY POSITIONS with rapid advancement and future security virtually assured.

YOUR SUCCESS depends on the quality of training you receive... and the reputation of the school you attend.

YOUR GUARANTEE we are giving the best in mechanical and technical training is proved by the fact... High pay jobs in Industry, and ratings in the Armed Forces now waiting for our graduates.

RESIDENT SHOP TRAINING is easier and costs less than you may think! We provide you with housing and part-time jobs while in school, plus free nation-wide placement service for graduates.

Check subject above in which you are interested and mail for

FREE BOOKLET

Your Future
IN
ELECTRONICS
AND
AUTOMATION

BAILEY
Technical Schools

Veteran Approved

1650 S. Grand, St. Louis 4, Mo.

Your Future
IN
DIESEL and
AUTO
MECHANICS

Name _____ Age _____

Street _____

Town _____ Zone _____ State _____



**Popular Science Monthly
in cooperation with
the Home Improvement Council
ANNOUNCES
A Gigantic Home Improvement Contest
\$125,000
in CASH PRIZES**

PLUS a second offering of 500 FREE Bernz-O-Matic Torch Kits given to the first 500—who enter! 500 famous TX-888 Bernz-O-Matic Torch Kits (retail price \$8.88)—consisting of the famous Bernz-O-Matic Torch, Utility Burner Head, Flame Spreader and Soldering Tip. Qualify for a FREE Torch Kit by participating in the GIANT Home Improvement Council Contest.

Read instructions carefully. Home Improvement Council Contest closes midnight June 30, 1958.

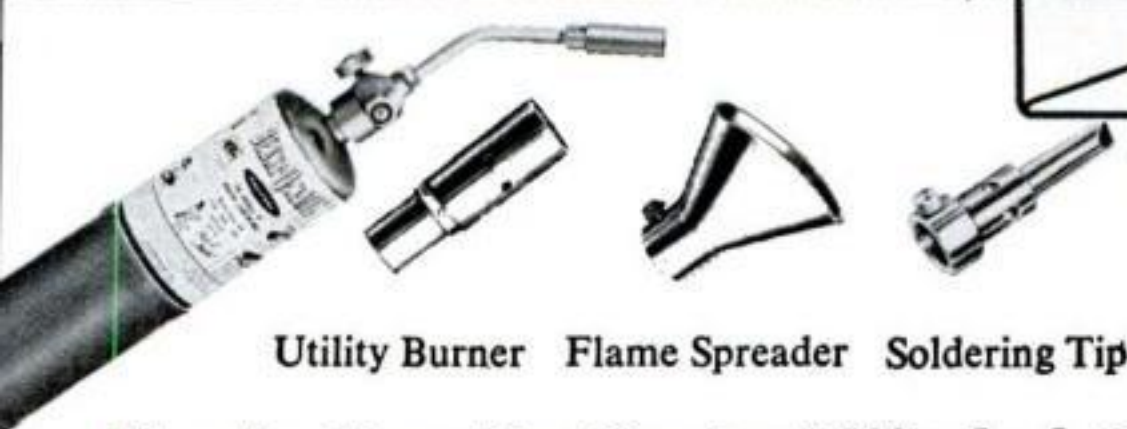


Nothing to buy—No strings attached!

Pick up your Home Improvement Council Contest blank at your local hardware or building supply dealer.

PROPANE TORCH KITS

FREE



Utility Burner Flame Spreader Soldering Tip

Here's How the Contest Works! Get an entry blank at any hardware or building supply dealer who displays the official Home Improvement Council emblem shown in this advertisement. To win a Torch Kit, mail that blank, filled out, to POPULAR SCIENCE MONTHLY. If you can not obtain a blank at your local dealer—send in the April POPULAR SCIENCE coupon on this page, and a Home Improvement Council blank will be mailed to you at once. After filling it out carefully—return the H.I.C. blank without delay to POPULAR SCIENCE MONTHLY.

Act quickly—win a BERNZ-O-MATIC TORCH KIT. This is the second group of 500 BERNZ-O-MATIC TORCH KITS, POPULAR SCIENCE is offering to the first 500 to return the entry blank completely filled out. Winners will be judged by the earliest postmark. In case of a tie—duplicate prizes will be awarded.

You can be eligible for the \$125,000 in cash prizes in the regular Home Improvement Council Contest whether or not you win a Bernz-O-Matic Torch Kit.

Popular Science-Home Improvement Council
P.O. Box 77—Trenton, N. J.

A

I want to join the Home Improvement Council Contest and win a Bernz-O-Matic Torch Kit. Please mail me the Home Improvement Council Contest entry blank.



NAME _____

ADDRESS _____

CITY _____ * ZONE _____ STATE _____

YOU MAKE 'EM WE SELL 'EM!



Let me show you how to build a big pay business of your own without canvassing, without house-to-house selling!

I'll show you a simple easy way to make dozens of "Made-to-Order" cases for musicians, salesmen, hunters, manufacturers, fishermen, gun collectors, phonographs and 1001 other portables. I'll supply instructions, tools, materials—everything you need. My plan is absolutely safe! You risk nothing! Keep your present job and work sparetime until you decide to devote full time to this big pay work that is so fascinating... Set up your shop wherever you have

MY NATIONWIDE SALES ORGANIZATION WANTS TO WORK FOR YOU!

a few spare feet. With my plan anyone can have his own business without a big investment and without previous experience; and remember you don't have to worry about sales because my National Sales Staff sells for you.

I am very satisfied to make a small profit because I can count on big volume on the supplies I sell to Casecrafters, yet home workers make a big profit because the finished cases sell for up to ten times the cost of materials... Write for full, FREE, details today.

ABARSI CASECRAFT 807 SUNSET BOULEVARD Dept 24 Los Angeles, Calif.



JACK STEARNS made \$450.00 on his first order for cases. **SO CAN YOU!** POSITIVE PROOF SENT TO YOU FREE!!!

U-MAK-IT BOAT KITS



30 years of boat kit pioneering. 30 models. Prams, Row-boats, Outboards, Cabin Cruisers and Skiffs.

SEND FOR ILLUS. CATALOG

Showing all models from 8' to 23'. Const. details, paints, access., etc. All you need to build your own.

MAIL 35c (coin) for Postage & Handling.

NEW LAPSTRAKE SKIFF KITS

Now added to our great line of kits, new easy to assemble Lapstrake Skiffs.



U-MAK-IT products

DELAND, FLORIDA, DEPT. 11

LAW FREE BOOK THE LAW TRAINED MAN

Write today for a FREE copy of illustrated law book, "THE LAW-TRAINED MAN," which shows how to earn the professional Bachelor of Laws (LL.B.) degree through home study of the famous Blackstone Law Course. All necessary books and lessons provided. Moderate cost; convenient monthly terms. Write for FREE law training book today.

Blackstone School of Law, 307 N. Michigan Ave.
Founded 1890 Dept. 124, Chicago 1, Illinois

KEEP YOUR... EYE ON BENJAMIN for HIGH H.C. COMP AIR GUNS & CO₂ GAS GUNS—Top Quality at LOWEST PRICES!

BB Benjamin Super CO₂ Rocket Gas Pistol with 2-Stage HI-LO Jet Power as low as \$13.95



All Models Benjamin CO₂ Carbine Gas Rifles and Benjamin CO₂ Rocket Gas Pistols Use Standard Size CO₂ (Soda) Cartridges (available everywhere). 2-Stage HI-LO Jet Power—High for Small Game—Low for Target—Up to 50 Shots from Each Cartridge. No Pumping—Accurate—Safe—Economical—Non-Toxic. 12 Models BB or 177 or 22.

Benjamin Air Rifles and Benjamin Air Pistols are Recognized All Over the World for Finest Workmanship and Highest Quality at Lowest Prices. Adjustable Power with Amazing Optimum Force. Fully Guaranteed—Accurate—Safe—Economical. Easy to Use Anywhere—12 Models for Target and Small Game 22 or 177 or BB from \$18.50.

FREE!

Catalog All Models Benjamin Air Guns & CO₂ Guns & Supplies. Also, Money-Saving Offer on Hunting & Fishing Knives, Accessories, etc.

Send Gun Catalog and Special Knife Offer!

BENJAMIN AIR RIFLE CO., 852 BARRY ST., ST. LOUIS 4, MO., U.S.A.

Name _____ Address _____ City _____ State _____

MAIL TODAY!

NEW FALSE PLATE FROM YOUR OLD ONE IN 18 HOURS



AS LOW AS \$14.95

Send us your old broken, cracked or loose plates and we'll transform them into new lightweight wonder plastic plates. NO IMPRESSIONS needed with our revolutionary method. We use your own old plates. We remake them completely in only 18 hours. Missing teeth carefully matched and replaced. We GUARANTEE TO SATISFY YOU OR REFUND YOUR MONEY.

SEND NO MONEY—Send us your name today and we'll RUSH COMPLETE DETAILS. Begin to enjoy life right now. Clip this Ad; save it and send for free facts.

CHICAGO DENTAL PLATE LABORATORY • Dept. P54-58
30 N. Dearborn St. • Suite 714 • Chicago 2, Ill.

TREMENDOUS Profits with Hagen's Exclusive



TEAR GAS PENCIL!
100% PROTECTION
This Tear-Gas Pencil discharges smothering clouds of tear gas to instantly stop, stun and incapacitate the most vicious man or beast, an effective substitute for dangerous firearms; leaves no permanent injury. No selling experience needed. Handle as a profitable sideline... soon you'll sell it full time. Start now! Send \$5.95 for complete demonstrating kit of Automatic Tear Gas Pencil, 10 demonstrators & 3 Powerful Tear Gas Cartridges. Not sold to minors.

HAGEN SUPPLY CORP., Dept. P-48, St. Paul 4, Minn.



LETTERS for all OCCASIONS

with over 300 MODEL LETTERS

Every type of business, personal and social letter is covered in this practical guide. Contains more than 300 MODEL LETTERS, among them: in business, Letters of Application, Inquiry, Claim, Complaint, Sales, Order, Collection, Credit, Recommendation, Promotion, etc.—and socially, Invitations, Announcements, Congratulations, Condolence, Thanks, Sympathy, etc.—and also just friendly letters to family, friends and people you know. Also includes advice on form, punctuation, spelling, etc. Finding the right thing to say in a letter sometimes poses a problem. Not so when you have this marvelous book of "Letters For All Occasions." Only \$2.00 postpaid from **GRIFFIN PUBLISHING CO., 1170 Broadway, Dept. P-4, New York 1, N.Y.**



GOVERNMENT SURPLUS PORTABLE STAND

12 FT. HIGH

A fully portable and collapsible stand that is adjustable to over 12 ft. high. Stand can be used as flagpole, aerial, TV Antenna, portable and emergency signs, traffic barriers, etc. Adjustable and removable swing fork arm bracket that extends to over 4 ft. wide. Excellent for a floodlight stand for illumination for photography, gardens, patios, swimming pools. Easily movable, with carrying strap, weighs only 35 lbs. Made by Bardwell-McAllister with 4 in. Bassick Ball-Bearing Casters. BRAND NEW. Only \$11.95 f.o.b. Brooklyn. Send \$5.00 deposit on C.O.D.'s Floodlights also available.

ONLY \$11.95 F.O.B. Brooklyn

STEVENS MFG. CO.

Jamaica 22, N. Y.

Box 53

WORLD'S GREATEST

CLASSIFIED

OPPORTUNITIES

Here are hundreds of opportunities offered especially
to the readers of Popular Science Monthly.
Read them. Answer them! You can make
and save money.



POPULAR SCIENCE MONTHLY - 353 FOURTH AVE. - NEW YORK CITY 10

Classified Ads only \$1.10 per word insertion, payable in advance. Minimum ad 10 words.
To be included in June issue, copy should be in our office by April 23. No cancellations accepted after April 15. Address orders to O. K. Kelly, Classified Adv. Mgr.

1 AUTOMOBILES & MIDGET CARS

CROSLY And Foreign Car Owners Catalogues Available Parts Discount. Box 7, Elmont, New York.

NON-profit organization offers automobile literature—old, modern and foreign; dealer books, service manuals, glossy photographs; free motor magazines. Write to get on free mailing list. Auto Maniacs, Stockbridge, Michigan.

NEW Catalog on Power Cams and Flywheels 25c. Weber Cams, Box 33175, Los Angeles 33, Calif.

BOYS Power Driven Auto. Build your own. New 1958 plans, parts list 35 cents. Sypher Co., Sta. F., Toledo, Ohio.

OLD copies of Popular Science wanted—any issue from period 1890 to 1915. Condition not too important provided books are complete with no pages removed. Write to Box No. 308, Tuckahoe, New York.

2 AUTO SUPPLIES & EQUIPMENT

SAVE money on Jeep and army truck parts. Large inventory. Catalogs for Jeep and G.M.C. owners. American Auto Parts Co., 1830-PS Locust, Kansas City, Missouri.

FREE Giant 1958 Parts Catalog. Thousands Scarce Accessories Stores Don't Have... Gadgets, Custom Equipment. Send 25c Postage (Refundable). Newhouse Automotive Industries, 5805-PS-4 Beverly, Los Angeles 22, Calif.

RECHROMING Kit for Automobiles. \$2.98. Details. Fairmont Chemical. East Syracuse, New York.

FORD A and T parts? Try best source old model parts, all makes. Wisniewski, Milwaukee 7, Wisconsin.

FREE! 1958 Automotive Catalog. 260 pages—75,000 items. Parts of every description for stock cars, hot rods, custom cars, trucks, and station wagons. Save up to 50%. Same day service. Quality guaranteed or money back. Send 25c (refundable, first order). J. C. Whitney, 1919 PS-4 Archer, Chicago 16, Ill.

SAVE Expensive Metal Parts with easy-to-install Davis Ball Boot. Encloses drive shaft coupling on 1941-1954 Chevrolets, all models. Stops dirt intrusion, stops lubricant loss, stops wear on metal parts. Other models for later Chevrolets and Fords. Write for free literature. Davis Ball Boot Company, Inc., 2305 Yale Street, Houston, Texas.

COMPLETE overhaul \$3.95! 10,000 mile guarantee! Effess, 3017-S Moffat, Toledo 6, Ohio.

LATE model owners. Play safe, install reliable gauges. Ammeter \$1.80, Oil Pressure \$2.20 postpaid. Money back guarantee. Sullivan's, 1942 Rhode Island Ave., Aliquippa, Penna.

WANTED: Ford Dynamatic Fan Drives Part #59A8665. \$1.00 each bonus for you. Check your Ford dealers. Contact me; if I buy you get paid. What can you lose? John Ramsay & Son, 513-29 N. Madison Street, Allentown, Penna.

PUT Leap In Your Jeep. Henry-J, or Kaiser. V-8 Power. See Jeep Owners Ad. Page 54.

USE THIS HANDY INDEX TO FIND WHAT YOU WANT

Advertising, Agencies for Advertisers...	53
Agents Wanted	43
Air Conditioning	7A
Antiques, Relics & Indian Goods	29
Artists Supplies	76
Astronautics	5A
Authors Service	52
Auto Supplies & Equipment	2
Auto Trailers	3
Automobiles & Midget Cars	1
Aviation	5
Batteries, Generators, Etc.	6
Boats, Outboard Motors	11
Body-Building Courses, Jiu Jitsu, Etc.	12
Books & Magazines	23
Business Opportunities	37
Business Service, Information, Name Lists	50
Buy It Wholesale	38A
Cameras, Photo Supplies	34
Camping Equipment & Tents	16
Cartooning, Sign Painting, Chalk Talks ..	54
Chemistry & Physics	41
Coins & Currency	26
Color Photo Finishing	32A
Contests	46
Detectives	47
Do-It-Yourself	66
Dogs, Birds, Hamsters & Pets	17
Educational & Instruction	45
Electrical Supplies & Equipment	7
Enamels, Paints & Varnishes	64A
Engines, Motors, Etc.	10
Farm Machinery	10A
Farms, Other Real Estate	19
Field Glasses, Telescopes	14
For Inventors	60
For Sale Miscellaneous	71
For the Home	69
Formulas, Plans, Etc.	39
Free Raising	18A
Games & Entertainment	24A
Geiger Counters, Treasure Finders	77
Help Wanted	42
High-grade Salesmen	44
Hobbies, Collections	31
Home Craftsman	65
Hypnotism	24
Inventions Wanted	61
Language Outfits	48
Live Bait	18
Machinery, Tool Supplies, Etc.	9
Magic Tricks, Puzzles, Etc.	25
Manufacturing	63
Minerals & Precious Stones	30
Miniatures	31A
Miscellaneous	79
Models, Model Supplies	64
Money-making Opportunities	38
Motion Pictures, Slides, Sound Equip.	33
Motorcycles, Bicycles & Supplies	4
Music, Song Writers & Records	35
Of Interest To Women	70
Old Gold, Jewelry, Watches	67
Old Stamps Wanted	27
Patent Attorneys	59
Patents For Sale	62
Personal	80
Photo Finishing, Photocopies, Etc.	32
Plastics	40
Plays, Stories, Etc.	49
Poultry & Supplies	21
Printing, Multigraphing, Etc.	57
Printing Outfits, Supplies	58
Profitable Occupations	22
Radio, TV, Supplies & Equipment	36
Razor Blades, Shavers	74
Rubber Stamps & Office Supplies	56
Special Services	51
Sporting Goods, Guns, Fishing Tackle, Etc.	15
Stamp Collecting	28
Tattooing Supplies	75
Tobacco & Pipes	68
Trees, Shrubs, Roots & Herbs	20
Trigonometers	9A
Typewriters & Office Machines	55
Wanted to Buy	72
Watch Repairing	78
Wearing Apparel	73
Welding, Soldering	8
Western Merchandise	79A
Wheels-Axels-Hand Trucks	10B

PARTS Model A. Other, Reasonable. Matco, Box 135, San Pedro, Calif.

\$4.95 BUYS HiFiTone 6x9" Rear Seat Speaker Kit complete. Autoradio, 132 State St., Schenectady, N. Y.

DUAL Auxiliary Accelerator Left Foot Gas Pedal. \$6.95. Lehner Company, Ness City, Kansas.

JEOP tops \$7.50, door curtain \$3.50 (with rod; \$5.00), side curtain \$2.00. Prices FOB; Jacksonville, Texas; Surplus Sales.

RING-Valve Job while driving, \$6.00. Literature. Motaloy, Grantham 27, Pa.

3 AUTO TRAILERS

BUILD Expanding eight foot trailer. Accommodates five. Literature 10c. Framar Company, Wilmington, Massachusetts.

4 MOTORCYCLES, BICYCLES AND SUPPLIES

RECONDITIONED Motorcycles and motors. Chromium accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales, Kansas City 27, Missouri.

DOODLEBUG motorscooter \$15. Cushman \$20, less engines. Doodlebug engine \$5. Whizzer \$5. Midget car with motorcycle engine \$75. Indian engine and transmission \$15. (Mailorder only.) Send 25c (35c for first class mailing) for Directory-Catalogue Number 82, just out, listing these and hundreds of other bargains, homebuilders parts, plans, etc. Midget Motors Directory, Athens, Ohio.

SERVICYCLE \$20.00; Whizzer Motorbike \$25.00; Cushman motorscooter \$25.00; midget auto \$25.00. Rush 25c (35c first class mail) for new catalog #962 listing many other amazing bargains in motors, midget cars, motorscooters, motorbikes, construction plans. Associated, Box 534, Toledo, Ohio.

MOTORIZE bike, cheap, easy, plans \$1.00. Negravco, 615 Scott Ave., Redwood City, California.

DO-it-yourself Bicycle Tools. For chain repair and wheel straightening. Enclosed in plastic kit with detail instructions. \$1.25. Bike-Rite, Box 163, Scranton, Pa.

5 AVIATION

AIRPLANE Recognition Posters 18" x 25". U.S.A. and Foreign. Decorative. Instructive. 120 Assorted \$4.97. 30 Assorted \$1.98. 10 for \$1.00. 3 samples 50c. Postpaid. Karl Ort, Box 21S, Thomasville, Penna.

BUILDING Your Own Airplane is Easy with our New Simplified "Stits Playboy" and "Flut-R-Bug" Construction Blueprints. For Details (with Photographs, 3-view and Cut-away Drawings). Mail \$1.00 to Stits Aircraft, Box 3084S, Riverside, California.

BUY surplus aircraft; engines; fuselages; radios; cameras; instruments; helicopters; misc., direct from Gov't. depot. List, Procedure \$1.00. Royal, Box 155B, Cliffside, N. J.

BUILD Flying Platform. Scale drawings, components description; \$2.00. Shelby, Box 573J, Bellflower, Calif.

POPULAR SCIENCE OPPORTUNITIES

SMALL Helicopters Theory and Guide Manual. Drawings. Construction Data. \$2.00. Sandhill Aircraft, Box 336, Atkinson, Nebraska.

HOMEBUILT Helicopter Handbook. \$1.00. Homebuilt Helicopter Directory. \$1.00. Homebuilt Designer (Lightplane) Handbook. \$1.00. Homebuilt Airplane Directory. \$1.00. Urshan, Box 4332 N.P. Station, San Diego 4, California.

PROPELLERS, plans, supplies for airboats and snowplows. Latest designs. prompt delivery. Catalog 25c. Banks-Maxwell, Box 3301G, Ft. Worth 5, Texas.

BUY direct now from U.S. Government Depots—Surplus aircrafts; fuselages; assemblies; aircraft engines; helicopters; instruments; electronics; radiotelephones; Misc.—Send for Bulletin "Depot List & Procedure" \$1.00. Box 8-PS, Sunnyside 4, N.Y.

HOMEBUILT Helicopter Rotors. Picture, Specs., Prices 50c. Adams, Box 6042-N, Lakewood, Calif.

5A ASTRONAUTICS

NOW!! Join the United States Rocket Society, Inc. \$1.00 per year, under 18; \$3.00 per year, over 18. Oldest rocket society with a continuously published magazine. U.S. Rocket Society, Inc., Box 271A, Pittman, Nevada, USA.

ROCKET Makers Kit. Body parts, Office material, Parachute, Safety fuse, Instructions \$2.00. Central Rocket Co., Box 221PS, Waupaca, Wisconsin.

6 BATTERIES, GENERATORS, ETC.

EDISON Nickel Storage Batteries. Any voltage, any amperage. Unconditionally guaranteed. Power Plants, Generators, Motors, Literature. Hawley Smith Co., Croton Falls 2, New York.

7 ELECTRICAL SUPPLIES & EQUIPMENT

ELECTRIC Pencil: Engraves all Metals. \$2.00. Beyer Mfg., 10511-C Springfield, Chicago 43.

LAMP parts Wholesale. Thousands of items for repairing, converting Catalog 25c. Brown Lamp, Box 305D, Clayton 5, Missouri.

APPLIANCE Parts Wholesale. Irons, percolators, ranges, vacuums, etc. New large illustrated catalogue 25c. Seco, 26 So. 20 Street, Birmingham 3, Alabama.

ELECTRIC Heat Gun of 101 uses. Drying, softening, thawing. Delivers quick safe heat at 35 CFM up to 750°F. 14 ampere element 115V. AC. Stand, switch, 10' cord. \$28.50. Brown Engineering Co., 3430 W. Klehnau, Milwaukee, Wisc.

8 WELDING, SOLDERING

BUILD-Your-Own welder or welder and power combination. Low cost unit connected to used engine lets you weld anywhere. Free booklet tells how. Get into profitable welding business. Write Hobart-weld, Box P482, Troy, Ohio.

WELDERS, 110/220. Welds 1/2". \$39.50. Morris, 1070 Inner Drive, Schenectady, New York.

ACETYLENE Welding Outfits new \$54.50; Arcwelders \$56.50; Eagle Welding, Dept. 42, 5085 Broadway, Chicago 40, Ill.

9 MACHINERY, TOOL SUPPLIES, ETC.

WOODSMEN . . . read about the amazing Spencer No Bounce magnesium wedge—ideal for frozen wood. Send for free copy of Chain Saw Age magazine, Portland 66, Oregon.

OIL Drum Cement Mixer Assembly Kit. Circular. Nu-Way-Do Co., Newaygo, Michigan.

SURPLUS Socket Wrenches. Half Price. Davis, 3606-C Lakeland, Shreveport, La.

SURPLUS. Bid Direct. Government Sells Machinery, Automotive, Aircraft, Miscellaneous Equipment. Lists, Procedure \$1.00. Harkin, Box 381, Lawndale, Calif.

ECONOMY speed reducers, torque converters, vari speeds, couplings. Catalog. Elgy Sales, 131-PS East 70th, Kansas City 13, Missouri.

MAKE Concrete Drain tile. Simple, inexpensive machine. Write: Ceeten Products, Cornelia, Georgia.

9A TRIGONOMETERS

ENGINEERS, Draftsmen, Students: Triangulator Makes Trigonometry Easy. \$1.00. No C.O.D. Trical, Box 67, Buffalo 15, New York.

10 ENGINES, MOTORS, ETC.

DIESEL Injector Parts Wanted GM51-71-110. Mayer, 7120 Carnegie, Cleveland 3, Ohio.

REWIND Motors yourself. Complete instructions \$1.00. Lewis Mfg., Howell 11, Michigan.

NEW Gasoline Engines 2 H.P. \$21.50. Free Equipment Folder. Loren Products, Danville, Illinois.

GAS Engines: Briggs Stratton: 2-2 1/4 H.P.: Recoil Starter: Cast Iron: Horizontal Shaft: Brand New: Factory Fresh: Latest (Model-6) Were Priced \$64.80: Special Price \$44.50 Freight Paid: (Special Price 10 or more). Money Back Guarantee: Details Free: Northern, 162-S Merrimac Street, Boston 14, Mass.

10A FARM MACHINERY

SENSATIONAL Garden Tractor. Hoes between plants and rows, including strawberries. Eliminates hand hoeing. Nothing else like this. Patent 2742840. Also tills. Fantastic offer to first few inquiries. Auto Hoe. DePere 69, Wisconsin.

10B WHEELS, AXLES, HAND TRUCKS

RUBBER tired disc wheels. All sizes. For home, farm, industry. Ball, roller, oilite bearings. For wheelbarrows, shop, farm, machinery. Coaster wagons, market carts, lawn furniture, etc. Hand trucks. Axles. Free specifications, prices. Mobile Wheel Products, 1510 McClellan Ave., Detroit 14, Michigan.

11 BOATS, OUTBOARD MOTORS

NEW, used, rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

FREE big catalog: Boat Kits save 1/2 to 2/3 "factory built" prices. 8' through 13' outboards designed for amateur assembly. Trailers, Fiberglass, Hardware, Accessories. Luger, Dept. K-4, 9200 Access Rd., Minneapolis 20, Minnesota.

SAVE Money. New, used outboard motor parts. Send wants. Stamp appreciated. Outboard Motor Mart, 229-S State, Boston 9, Massachusetts.

FULL size, cut-to-shape boat patterns, blueprints, 7 1/2-38 feet. Big new 88 pg. illustrated "Build a Boat" Catalog of Naval architect-designed Cruisers, Runabouts, Skiffs, Outboard Boats, Sailing, Racing, Houseboats. 50c. "How to Build a Boat" Booklet, \$2.50. Hardware & Equipment Catalog, \$2.00. Cleveland Boat Blueprint Co., Dept. A-77, Box 1651, Cleveland, Ohio.

MARINE conversions. Ford, Chevrolet V8, Jeep engines. Catalog 25c. Lehman Manufacturing Co., 972A Broad St., Newark 2, N.J.

BOAT Plans—Full Size Patterns—Frame Kits. Modern Inboards and Outboards for amateur builders. Complete New Catalog 50c or specify requirements. New Speedboat Inboard Hardware Catalog 25c. Glen Marine, 9152 Rosecrans, Bellflower, Calif.

FREE Catalogue. Rubber Boats, Life Vests, Tents. Box 22PSB, Thomasville, Penna.

BOAT Trailers, Accessories, Parts, Hitches, Tires. Literature 10c. Refundable—Blauvelt, Kinnelon, N. J.

WATER Ski kits, laminated. Save 50%. Quammen's, Route 4B, Stillwater, Minn.

GOVERNMENT Sells—Surplus Boats: LST's; LCVP's; Aircrafts; Helicopters; Jeeps; Trucks; Tractors; Radiotelephones; Misc.—Buy direct now from U.S. Government—Get "Depot List & Procedure" \$1.00. Box 8-PES, Sunnyside 4, N.Y.

FIBERGLASS your boat! Wholesale prices. Send for information, sample. Aqua Glas, Box 442, Altadena, Calif.

CHROME-Plastic and Scotchlite Letters. Details Free. Gillette, 817 W. 3, Duluth, Minnesota.

FREE Catalog—boat covers, motor covers, fenders, life jackets, cushions, marine hardware, anchors, water skis. Manitowoc Awning & Cotton Goods Products Co., Dept. S, Box 261, Manitowoc, Wis.

MOLDED Boats: inboard, outboard, sail \$139.50! Marinecraft, Box 161-P, Brighton, Mass.

WATER Skis. Complete plans including bindings. No special tools needed. Money back guarantee. Price \$1.00. S. L. Hudson, 2615 Anderson Road, Duluth, Minnesota.

12 BODY-BUILDING COURSES, JIU JITSU & ATHLETIC EQUIPMENT

BUILD powerful arms, chest, shoulders! 22 exercises, \$1. Ponsad, Box 601-C, 1100 Market, Wilmington 99, Delaware.

OUTSTANDING Physical Development! Any age. New Guaranteed Discovery Uses Only A Rope! Strength, Health, Muscles. Gain-Reduce. Free Details. Roperice, 4834-B Art, San Diego 15, California.

KARATE, Begins where Judo leaves off. Power that splits planks bare handed. \$2.00. Enlarged Edition \$3.98. J. Lee, P.O. Box 245, Oakland 4, Calif.

BARBELLS, Dumbbells, Exercise equipment Courses. Free booklet. Good Barbell Co., Siloam Springs, Ark.

BUILD Mighty Muscles for all the Body. Complete—Fully Illustrated course 50c. Satisfaction Guaranteed. Jorgensen, P. O. Box 1450, M-3, Seattle 3, Washington.

PUSHED around? Don't take nonsense from bullies. Give them the shock of their lives. Easy when you know Police Jiu Jitsu. Complete fully illustrated course in one volume as taught police and armed forces. Send \$1 now. Money back guarantee. Books Publishing Co., Amityville 39, N. Y.

BARBELLS, Exercise Equipment, Health, Strength, Physique Booklet, 25c. Reading Barbell Co., Reading, Pa.

14 FIELD GLASSES, TELESCOPES

BUILD your own Reflector Telescope. Complete kit: Mirror, Eyepieces, Tripod, all other accessories. Request free illustrated literature. Criterion Manufacturing, Dept. KP-42, Hartford, Connecticut.

FREE Catalogue! Thousands war surplus optical bargains. Lenses, Prisms, Telescopes, Binoculars, etc. Send \$1.00 for 10 Lens Hobbyist Set and Project booklet. G. Jaegers, 691 West Merrick Road, Lynbrook, New York.

WAR Surplus bargains! Millions of lenses, instruments, telescopes, binoculars, components and complete line of astronomical telescope items. World's greatest optical market place! Send only \$1.00 for beginner's 10-lens kit and big instruction booklet Stock 2-CN. Write for catalog-CN Free. Edmund Scientific Co., Barrington, New Jersey.

REFLECTING Telescope completely assembled. 60X. \$29.75. Guaranteed Observatory clearness. Free information. Skyscope, 475 Fifth Avenue, New York 17.

AMAZING prices, precision binoculars. Folder "Binocular Selecting." catalog free. Dealers also write. Prentiss Importers, Mercury Bldg., West Los Angeles 25, Calif.

BINOCULARS, telescopes, microscopes. Terrific values \$3.98 up. Request free money-saving catalog. Criterion, Dept. S-65, Hartford, Connecticut.

AMAZING 3X binoculars, folds into wallet size case. Clever focusing adjustment. Weight one ounce. \$1.95. A & G Sales, 456 Leslie Street, Newark 8, New Jersey.

REFLECTOR Telescope Kits \$7.25 (3") to \$175.00 (12"). Mirrors cells, Focusing Mounts, Tripods, Eye Systems. Anything, everything in telescopes. Optics—Also Binoculars, Microscopes, Optical Gadgets. Free Catalog. Also Ready to use telescopes from \$25.00. Esco Products, Oakridge, N.J.

POPULAR SCIENCE OPPORTUNITIES

ASTRONOMICAL Books, Star-Atlases, free list. Herbert Luft, 69-11 229th Street, Bayside 64, New York.

MICROSCOPE Catalog 25c. Research Scientific Supplies, 126 West 23rd Street, New York 11, N. Y.

DYNASCOPE—Sensational New Reflector Telescope. Send for details. Criterion Company, Dept. DS-48, Hartford, Connecticut.

MAKE 6" Telescope reflector. Glass, abrasives, instructions—\$12.00. F. Cameron, Box 65, Inwood 96, New York.

"BUY Direct From Manufacturer". Mirrors, kits, lenses, parts for astronomical telescopes. Mirrors, lenses repolished. Price list on request. Kistner, Box 74 Wakefield, New York 66, New York.

REFRACTOR and reflector telescopes. Also mirrors, lenses, tripods, etc., for making your own telescopes. Free illustrated catalog. Suffolk Science, Mattituck, N. Y.

ASTRONOMICAL Telescopes. Space-K-Satellite \$29.95, Monolux, \$73.50. Rasmusen-Reece, Amsterdam, N. Y.

15 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAPPING

HOW To Catch Fish With Smell. Secret Recipes, Formulas, Methods, 25c. Jacksons, 312 Lake Avenue, Ithaca, New York.

100,000 PRODUCTS Wholesale—Free catalog! Send postcard: Econ-O-Mart, Whippany 16, New Jersey.

5,000 BARGAINS, firearms, binoculars, war relics, catalog 50c. Smith Museum, Runnemede, N. J.

BARBFREE shakeproof Hooks patented fish release Sample Hook Literature Prices 25c. Y. Seamco, Rt. 18, Pottstown, Pa.

BOOMERANGS Australian-type Prints 35c guaranteed flight. Km Anderson—PS, R-1, Temple, Texas.

CATCH and hold the big ones with the new Keeper Hook. Sells on sight. Salesmen's Samples—Three for \$1.00. No C.O.D.'s. Maurer Metal Specialties, Box 934, Springfield, Ill.

NEW carbon steel Fish Knife with leather sheath serrated back for scaling and cutting bone. \$1.50. Cattaraugus Cutlery Co., Little Valley, N. Y.

FREE Below Wholesale fishing catalog. Fishing Tackle Mart, Dept. 64, Box 6737, Chicago 80 Ill.

BUY Wilson Golf Equipment Wholesale. Crystal Golf Sales, Crystal, Michigan.

FREE Catalogue. Tents, Rubber Boats, Life Vests. Box 22PS4, Thomasville, Penna.

TRIPLE Scent, catches fish, apply to live, dough or artificial baits, bottle \$1.00. Aquachem, Box 5830, Kansas City 11, Missouri.

NYLON Rope, Lines, Cords. Every Description for all Household and Sportsmen's Uses. Finest Made. Free Catalog. Beebe Cordage Co., Cranford 7, New Jersey.

MOLDS for Fisherman's Sinkers. Jigs, Squids, Casting and Spinning Lures. Free Catalogue. Sweet's Molds, Tonawanda 3, New York.

FREE—Giant 1958 Wholesale Sporting Goods Catalog. Lowest wholesale prices. Complete line of fishing tackle, cameras, sporting goods, appliances, outdoor items. Write today. Santa Fe Distributing Co., 1321 Main St., Dept. 750, Kansas City, Missouri.

TACKLE Box—Beautiful waterproof plywood. Rustproof brass fixtures. Photograph free. Home Workshop Plans \$1.00. Sportster, Box 859, Milwaukee, Wisconsin.

JAP rifles altering American shells \$6.00. Jap shells \$3.95, catalog 5c. TP Shop, West Branch 10, Michigan.

LUGERS! Mausers! Colts! P-38s! Kentuckies! Weatherbys! Antique—Modern Guns, Guncessories! Super Bargain Catalog only 50c. Agramonte's, Yonkers 2A N. Y.

16 CAMPING EQUIPMENT & TENTS

TENTS, direct from manufacturer; world's largest selection. Low prices. Send 25c (print name-address) for 160 page complete catalogue of Tents, Camping Equipment, National Camp Sites guide & Camping handbook. Morsan, 10-15G 50th Avenue, Long Island City 1, New York.

DON'T buy anything until you've seen the "New Look" in camping. New camp trailer, a new cartop camper, new camp kitchen. Free illustrated brochure. Write: Heilite Trailers, Inc., Dept. P.S., Lodi, California.

17 DOGS, BIRDS, HAMSTERS, RABBITS & PETS

WHITE German Shepherd puppies. Theatrical dog tricks. Knoff, Nashotah, Wisconsin.

HAMSTERS—Golden: Young, \$3.00 pair, breeders, \$4.00 pair. New mutation, \$5.00 pair. Adirondack Hamstery, Prospect 13D, New York.

MAKE Big Money Raising Nutria, Chinchillas, Cavies, Mink, Rabbits, or Pigeons for us. Free information. Keeney Brothers, New Freedom, Pennsylvania.

RAISE rabbits on \$500 month plan. Plenty markets. Free details. White's Rabbitry, Delaware, Ohio.

SNAKES, Lizards, Turtles, Frogs bring good prices for full or part-time collectors. We buy and sell all kinds, all sizes, any quantities. Free Collectors Brochure, complete details. Biological Exchange, 1211G Wagner Lane, El Paso, Texas.

WE Pay \$3.50 lb. dried. Grow Mushrooms. Cellar, shed and outdoors. Spare, full time, year round. We have 25,000 customers. Free Book. Washington Mushroom Ind., Dept. 177, 2954 Admiral Way, Seattle, Wash.

GENUINE stuffed alligators 24" \$3.00—30" \$3.50. Special 15" alligator, bushy fox tail, raccoon tail, with surprise gift \$3.00 postpaid. Live baby alligators \$3.50. Koy's, Box 704, Logansport, La.

HAMSTERS—Ideal Pets. \$2.95 pair. Free Booklet. Jer-Fre's Hamstery, 2425 Hoyt, Muskegon Heights 14, Michigan.

RAISE Rabbits For Us—Profitable Angoras, Chinchillas, New Zealand. Particulars Free. Grinsteads, Edwardsville, Illinois.

18 LIVE BAIT

\$1,000. MONTHLY Possible. Raising Earthworms. African Giants! Backyard, Garage, Basement. Complete Illustrated Booklet. Explains Raising, Feeding, Packing, Marketing. Only 25c! Ozark Worm Farm-V, Willow Springs, Missouri.

FREE List: Earthworm Raising books and manuals; instruction folder. Earl Shields, Box 358-B, Mountain Home, Arkansas.

\$10,000 YEAR possible, earthworms. 32 Page booklet tells how 35c. Missouri Earthworm Research, Box C-6851, Kansas City, Missouri.

18A FROG RAISING

FROG, Crayfish Raising. Profitable. Brochure, \$1.00. Vol Brashears, Berryville, Arkansas.

19 FARMS, OTHER REAL ESTATE

FLORIDA—Nice homesites, \$345 at \$10 monthly. Folder Free. Winfree Vernor, DeLand, Florida.

FLORIDA Trailer Homesites. Water System. \$495.00, \$10.00 Monthly. Lake Privileges. Box 2005, Deland, Florida.

FLORIDA Waterfront Homesites, moderate priced for retirement. Monthly payments. Good fishing, hunting. Adjoins Ocala National Forest. Grace Parker, Paisley, Lake County, Florida.

FLORIDA—Half acre tracts—high-dry. Near Gulf Beaches. Raise your own fruits and vegetables. Only \$795.00, \$10.00 down, \$10.00 month. Information: G. B. Potterfield, Owner, Dept. AA, Union Bldg., Charleston, W. Va.

MOUNTAIN lots near lakes. \$147.50, \$5.00 monthly. Charlie Pratt, Box 6331, Greensboro, N. C.

STROUT Catalog—Free! 3,186 Bargains, 34 States, Coast-to-Coast. Farms, Homes, Businesses. World's Largest! 58 Years Service. Strout Realty, 251-ZB 4th Ave., New York 10, N. Y.

FLORIDA Winter Garden Farms. 10 Acres at \$25 monthly. Beautifully wooded. Popular Gulf resort area. Wonderful fishing, hunting. Grow fruits, berries, vegetables, poultry. Money-back Guarantee. Booklet Free. Douglas Wood, Fountain, Florida.

FLORIDA—2½ acres: \$15 down, \$15 monthly; full price—\$695.00. High elevation, near Gulf of Mexico. Suitable Farming, citrus, poultry. Free information. Florida Sunshine Coast Development Co., Brooksville, Florida. Dept. PS-4.

20 TREES, SHRUBS, ROOTS, HERBS

RAISE Your shrubs, trees from seed. Free planting guide, price list. Woodlot Seed Co., Norway 46, Michigan.

GINSENG Goldenseal roots bring up to \$14 pound. Full information, F. G. Collins, Viola, Iowa.

FANCY Leaved Caladium bulbs. Per 100 ¾ inch \$8.00, 1 inch \$12.00, 1½ inch \$16.00. Clarence Rehrig, 1505 St. Rd. 17, N. Sebring, Florida.

GROW From Seeds—Big profits with our instructions. Evergreens, Shrubs, Christmas Trees. Large packet, 15 varieties \$1. Free catalog. PSM Mellinger's, North Lima, Ohio.

22 PROFITABLE OCCUPATIONS

\$5000 FROM Half Acre growing Ginseng, crop bought. Particulars 10c. Associated Growers, Sperling, Manitoba.

SAVE Money! Buy Wholesale! Free Catalog General Merchandise. Norris, 487-H Broadway, New York.

BIG Profits in Welding. Easy to learn. Low cost training in completely equipped Non-Profit school. GI Approved. Write for Free Booklet—Hobart Trade School, Box P-483, Troy, Ohio.

FREE Picture Folder, "How to Make \$3,000.00 Yearly Sparetime, Backyard, Raising Earthworms!" Oakhaven-7, Cedar Hill, Texas.

VENDING Machines—No Selling. Operate A Route of Coin Machines And Earn Amazing Profits. 32-Page Catalog Free. Parkway Machine Corporation, Dept. 17, 715 Ensor Street, Baltimore 2, Maryland.

WHOLESALE Price List Free! Save 50%! Appliances, Cameras, Sporting Goods, Housewares, Hardware, Jewelry, Clothing, Gifts, etc. Buy-Rite, Hawthorne 63, New Jersey.

BUY Wholesale! 25,000 Nationally Advertised Products. Get Amazing Dealer Catalogs. Complete Details Free. American Wholesalers, 1841-F Levee, Dallas 7, Texas.

AMAZING New Plan Free! "How To Retire At Age 21." Men or Women Over 21 Can Retire Now. Shows how you can prepare for life of leisure if you're under 21. Bob Belmont, Box 258, Hawthorne 3, N. J.

FREE Book "990 Successful, Little-Known Businesses." Work home. Plymouth, 1610A 43rd Street, Brooklyn 4, New York.

FREE Literature—Make Big Money Raising Fishworms and Crickets. Carter Farm-10, Plains, Ga.

WE Pay \$3.50 lb. dried. Grow Mushrooms. Cellar, shed and outdoors. Spare, full time, year round. We have 25,000 customers. Free Book. Washington Mushroom Ind., Dept. 101, 2954 Admiral Way, Seattle, Wash.

MAKE Money Selling Recipes and Household Hints by Mail. Information Free. Barrett, Dept. CA-28, 7464 No. Clark, Chicago 26.

LEARN netting and cord hammock making. Instructions \$2. Kask, Box 1072, Toronto 3, Ontario, Canada.

WHOLESALE! Thousands name brand products. Free catalogs! United Wholesalers, 1265-T Broadway, New York 1, N. Y.

SUCCESSFUL service business. Low investment. Best, 736 Granville, Vancouver 2, B.C.

POPULAR SCIENCE OPPORTUNITIES

TREE-mushroom pioneers! Spawn, Instructions, \$1.00. Ohga, PS110, Sigakenkusatu, Japan.

SECRETS Of Gold Buying! Large Profits. Source inexhaustible. Complete Instructions: \$2.00. Davis Enterprises, 1305 Paul, Norfolk 5, Va.

MAKE Money! Make and sell jewelry. Send 25c for Catalog listing complete line of supplies. Gem-Craft, Dept. J-52, 2185 E. 14, Cleveland 15, Ohio.

\$6,000 FOR Mister, Mrs.: \$3,500! Free "Secret Journal" Plan. Magical! Work home! Publico-N44, Oceanside, Calif.

\$60.00 WEEKLY, sparetime—easy! Home Venetian Blind Laundry. Free Book. Burt, 2434EX, Wichita 13, Kansas.

AMIDON Fittings produce extra income. Amidon Engineering Company, Elyria, Ohio.

LEARN Invisible Reweaving At Home. Free Details. Jack's Service, P.O. Box 3451, Freeport, Illinois.

MUSHROOMS Quicker, Easier, Cheaper. Newest Facts Free. Spawn \$1.00. Luxorco, 641 South 19th, Newark 3, N. J.

"HOW to Win Prize Contests". "Type-writer Profits". Booklets Mailorder, Drop-shipped, No Inventory Investment. Samples, Information \$1.00. Bayer, 938S Betty Avenue, Neenah, Wisconsin.

FREE Book "505 Odd, Successful Businesses." Work home! Pacific—37C, Oceanside, Calif.

\$12,000 YEARLY. That's what I earn in the Merchant Marine. Amazing facts to show you how only \$2.00. Ocean Sailor, Box 3567, Baltimore 14, Maryland.

23 BOOKS & MAGAZINES

BRITISH Book Bargains. Any subject. Catalog free. Transbooks, Box 1-PTB, Wantagh, New York.

GOOD Used Books. 50c-\$1. Free Lists. Editions, Dept. PS, Hempstead, New York.

WE want to buy old copies of Popular Science—any issue from period 1890 to 1915. Condition not too important provided books are complete with no pages removed. Write to Box No. 308, Tuckahoe, New York.

ATHEIST Books. Catalogue free. Truth Seeker Co., 38 Park Row, New York 8.

NATIONAL Geographic Magazines 1888-1952. Any issue. Periodical Service, Box 465-PS, Wilmington, Delaware.

DISPOSAL Sale: 12 New-Used books including giant novels \$1. Extra Special: 25 Diff. (\$8. Retail) \$2. only. Persil, 436 N. Y. Ave., Brooklyn 25, N. Y.

BOOKHUNTERS: All Subjects. Send Wants! Jaher Book Service, 183 Hazelwood Drive, Westbury, New York.

NATIONAL Geographic Magazine back issues to 1925. 60c postpaid. Hansens, Inc., 2721 East 11th Street, Oakland, California.

JOHN Friend, Bookfinder, can get the books you want. Free Search Service. Box 2570PS, Long Beach 1, California.

SCIENCE-Mathematics-Language Booklets! Lists Free. Franks, 3121 South Racine, Chicago 8.

BOOKHUNTERS! Send Wants! Atlantic Book Service, 10 Cedar, Charlestown 29, Mass.

VERY personal! "What A Male Teenager Should Know." 35c. Nailob Enterprises, Box 7103, New Orleans 19, La.

FREE Book Catalog—Many Interesting Subjects. Books Publishing Co., Amityville 39, N. Y.

CRAZY Book Titles. Embalming Can Be Fun. Raising Children For Profit. 8 others. Free Literature. Lynch, 402-8 Hazlett, Baltimore 29, Md.

24 HYPNOTISM

HYPNOTIZE Successfully! Learn Easy, Fast, Modern Methods. Complete, Illustrated Course, including self-hypnosis and "Secret Nerve Pressure Technique" (Guaranteed Harmless)—\$1.00. H. Fowler, 850 Draper Ave., Schenectady 6, New York.

FREE Illustrated Hypnotism. Selfhypnosis Catalogue. Write: Hypnotist, 8721 Sunset, Hollywood 46P, California.

BEGINNER'S Hypnosis . . . illustrated . . . \$1.00 Moneyback Guarantee. Baltimore School of Hypnotism, Dept. 84C, Box 6229, Baltimore 6, Maryland.

HYPNOTISM—New proven home study course. Complete section on Hypnotherapy. No Gimmicks—no gadgets. Money back guarantee. Certificate awarded. Midwest School of Hypnotism—Box 84—Bellwood, Illinois.

FREE Catalog! Hypnotism, Autohypnosis! Books, Tapes, Records! Drawer PS697, Ruidoso, New Mexico.

TELEVISION Hypnotist Emile Franchel offers comprehensive course hypnotism/autosuggestion for self-improvement. Examinations and certificate. No gadgets. 6134 Woodman Avenue, Van Nuys, California.

MODERN: Hypnotism — Selfhypnosis Step-by-step, Scientific Method \$2.00. William Struve, Carleton College, Northfield, Minn.

KRAY Mind! Hypnotize, one glance. Guaranteed \$3.00. Wamsteker, Box 10, Ottery, Cape, South Africa.

"HYPNOTIZE . . . One word . . . One fingersnap," on stage. Satisfaction—or refund. \$2. Hypnomaster, 846-S6 Sunnyside, Chicago 40.

LEARN Hypnotism—our book 25 lessons on Hypnotism shows how to achieve business and social success. \$1 postpaid. Satisfaction guaranteed. Books Publishing Co., Amityville 39, N. Y.

COMPLETE hypnotism course. 50c. Free Catalogs. Collins, Box 67, Appalachia, Virginia.

"HYPNODISK" 50c. "25 Lessons Hypnotism" Book 50c. Box 1352-H, Philadelphia 5.

24A GAMES & ENTERTAINMENT

USED Juke Boxes, Pool Games \$100. Hit Records 30c. Catalog Free. Wickens, 1139W. Summer, Appleton, Wisc.

DON'T play bingo blind. Know mathematical probabilities and percentages. Inquiries free. Renraw, 19 Irvington Place, Trenton 10, New Jersey.

25 MAGIC TRICKS, PUZZLES, ETC.

WORLD'S finest professional magic. Joker novelties. Giant illustrated catalog 10c. Top Hat, Evanston 13, Illinois.

3100 NOVELTIES, Jokes, Tricks, Gadgets, Funmakers, Hobbies. Big catalog 10c. Johnson-Smith, D-423, Detroit 7.

ONLY 10c brings you magic's greatest value. Douglas famous Catalog, 500 Tricks. Tricks for amateur and professional, for pocket, parlor, club, stage, with balls, coins, cards, cigarettes, silks, apparatus. Fastest service to magicians everywhere for over 30 years. Amaze your friends, send 10c today. Douglas Magicland, Dept. 20, Dallas, Texas.

GAMBLERS winning, cheating, exposed. Book \$1.00. Catalog 10c. Book, Box 671, St. Louis 1, Missouri.

BE a magician! Large professional catalog of latest tricks. 35c. Ireland, F-109 North Dearborn, Chicago 2, Illinois.

WHOLESALE! Thirty 10c Trick Novelties \$1.00! (Profits!) 1746-SW Market, Philadelphia 3.

NOVELTY Key Chain—Sample, 50c. Traxler, Box 118-S, Rockford, Ill.

"VENTRILLO" Voice Thrower 25c. Ventriloquist's Puppet 75c. Box 971-PS, Philadelphia 5.

ITCHING Powder, Trick Matches, Cigarette Loaders, 13 packages \$1.00. Arlaneco, Philadelphia 44.

26 COINS & CURRENCY

GET Profit and Pleasure in collecting old coins. Send 10c for 56-page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, 374 Mehl Building, Fort Worth, Texas. Largest rare coin establishment in U. S. Established 58 years.

COINS from Formosa, Vatican, etc., plus foreign banknote, 10c with coin approvals. Littleton Coin Company, Littleton S2, New Hampshire.

FOREIGN Coin, Banknote and large illustrated coin list for 3c postage. Bargains: Indian Head cent, 10c; Wooden Nickel, 10c; Chinese Dollar, 53c. Approvals included with every order. Tatham Coin Company, Springfield 50, Massachusetts.

WHAT nickel is worth \$3,500? Send 25c for latest book showing values of rare American coins. Stack's, 123 West 57 St., N. Y.

COIN Magazine, 160 pages. Sample 35c. Numismatic, 7320 Milwaukee, Chicago 31.

INDIAN Cent plus Bargain Lists 10c. Hutchinson's, Box 4747, Philadelphia 34, Penna.

RARE 1881 CC Mint Dollar \$3.00. New 100 pp. catalogue, 25c. Shultz, Salt Lake City 10, Utah.

32 PAGE Informative U.S. Illustrated coin list 10c. Stoney, 192-S Washington, Boston 8, Mass.

OLD Large Cent, 2c Piece, 3c Nickel, and Half-Dime—All For \$3.00. Catalog Free. Joray's, Box 38, Shouns, Tenn.

THREE Different Indian Cents 25c; List. Collector's Bargains, New Hope, Penna.

BRILLIANTIZE cleans metals instantly. Safe, Guaranteed. \$1.00 prepaid. Stephenson's, Ames, Iowa.

HONDURAS, Finland, Austria, Switzerland's Coins—All 10c. Jolie, Roslyn Heights, N. Y.

FLYING Eagle Plus Large Cent \$2.00. Rhode, 105 Windsor, Reading, Pa.

SENSATIONAL Bargains! Lincoln cents and Buffalo nickels. List 25c. Hugh's, 522 Second Avenue, N.W., Hickory, North Carolina.

COMMEMORATIVE Half Dollar Uncirculated \$1.00. Bargain Lists Free. Sayers, 1000 Unaka, Johnson City, Tennessee.

\$4,000.00 FOR 1913 Liberty Head Nickel. Uncirculated Dollars 1804—1839, 1893-S, 1895-P, 1903-O pay \$100.00—\$5,000.00. Certain Dates—Lincoln Cents before 1932—\$100.00; Flying Eagle Cents—\$500.00; Indian Cents—\$140.00; Dimes before 1943—\$2,000.00; Quarters before 1924—\$1,000.00; Half Dollars before 1905—\$1,000.00; 2c Pieces—\$100.00; 3c Pieces—\$130.00; Half-dimes—\$500.00. Hundreds of others worth \$10.00—\$1,000.00. Canadian Coins—1921—5c Silver—\$100.00. 1875 Quarters—\$75.00. 1921—50c—\$500.00. Wanted—20c Pieces, Gold Coins, Paper Money, etc. Our Large Illustrated Guarantee Buying—Selling Catalogue, Giving Complete Allcoin Information—send \$1.00. Purchase Catalogue before sending coins. Worthycoin Corporation, K-409-C, Boston 8, Massachusetts.

60 ASSORTED Coins, \$1.00. 60 Assorted Bills, \$1.00. Oddehon, Box 482, St. Louis, Mo.

AROUND The World there's nothing else like Bebee's 82-Page Gigantic Bargain Catalogue—Only \$1.00 (deductible on \$10.00 order). Beautiful Uncirculated complete sets—Argentina, Camerons, Cambodia, Colombia, Laos, Libya, Paraguay, Peru, Siam, Tahiti, Viet-Nam, each 95c. Ireland (8 Animals) in Green Box \$2.95; Philippine's General Douglas MacArthur \$3.25, Ceylon's 2500th Anniversary of Bhuddism \$3.45. Bebee's, 4514 North 30th, Omaha 11, Nebraska.

10 SCARCE 1800's Coins 50c. Bokco, 645 Ruth, Bridgeport 6, Connecticut.

COMPLETE United States coin bargain lists. Indianhead cent, 10c. Economy Sales, 156-B Dean, Mansfield, Massachusetts.

SAN Francisco Mint Closed! Made only cents and dimes in 1955. In short supply and great demand. One each, brilliant uncirculated for 25c. Free coin lists with order. Bryson Coin Company, 612 White, Toledo 5, Ohio.

SILVER Dollars: Uncirculated. 1880-CC through 1885-CC \$3.50 each. 1893-CC \$15.00. Allcoin lists 10c. Holden's, Garwin 1, Iowa.

LINCOLN, Indian Cents, all dates. 1909-VDB Cent and complete pricelist 50c. Penny Mart, CK-13, Box 629, Chicago 90.

INDIAN Cents 6 different 50c. Large Cent \$1.00. Price list 10c. R&M Coin Co., Box 5, Delanco, N.J.

WHOLESALE Coins for dealers, investors. Lists 10c. Al Johnson, Box 35, Colorado Springs, Colo.

POPULAR SCIENCE OPPORTUNITIES

PROOF-Sets. 1958 Set Only \$2.50, 1957—\$3.00, 1956—\$4.00, 1955—\$6.00, 1954—\$7.00, 1953—\$12.00, 1952—\$18.00, 1951—\$29.00, 1950—\$47.00. Complete Set 1950-1958 Inclusive—\$120.00. Postpaid. Prompt Ship-ment. Money-Back Guarantee. Dan's, Dan Morafka, A.N.A., 432-S 23rd Ave., San Francisco 21, California.

SILVER Dollars. Beautiful. Brilliant, uncirculated, San Francisco Mint—78-S, 79-S, 80-S, 81-S, 82-S, 87-S, 89-S, 90-S, 91-S, 97-S, 21-S, 22-S, 23-S, only \$2.00 each. 83-S, 98-S, 02-S \$2.75 each. Carson City Mint—80-CC, 81-CC, 82-CC, 83-CC, 84-CC, 85-CC, 90-CC, 91-CC, only \$3.00 each. Postpaid. 10 day Money-Back Guarantee of Satisfaction. Thousands of other coins. Proof Sets. Gold. Silver Dollars. Cents, etc. Free price list. Send your want lists. We also buy coins. What do you have? And please name your price. Postal Products Company, Fast Mail Order. Joe Gordon, A.N.A., 5614-SC California Street, San Francisco 21, California.

28 STAMP COLLECTING

TWO \$5.00 US stamps plus 20 different, 10c with US approvals. Irwin Stamp Co., Box 1109, Brooklyn 30, New York.

AMAZING Offer! 200 U.S. stamps—including commemoratives, airmails, high denominations to \$1.00—only 10c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

ICELAND 10 different beautiful stamps for only 10 cents to applicants for our good old fashioned approvals. Old Colony Stamp Co., Dept. B, Milford, Conn.

UNITED States commemorative collection containing 33 different—10c. Approvals. White, 516-W Avenue L, Brooklyn 30, New York.

WEIRD Diamond Shape Coffee Stamps. Lovely Flower Triangle! First American big commemorative. Greenland Idol Dancer, etc. Free with approvals. Capital Stamp Co., Ferrysburg 10, Michigan.

225 STAMPS For only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange Countries cataloguing up to 25c each! Also Approvals, Mystic Stamp Company, Camden 55, N. Y.

FREE! 107 British Colony Stamps. All different, from Britain's farflung colonial empire. Catalog value \$2.50. Free Stamp Magazine, Approvals. Send 10c for handling. Act now! Niagara Stamp Co., St. Catherine's 72, Ontario.

FREE! Amazing List! Alphabetical! Two Feet Long! Stampmart, Hartford 1, Conn.

WOW! 110 All Different Germany 10c Zeppelins, Semi-Postals, Airmails, High values, etc. Giant Catalog, bargain lists included with beautiful approvals. Jamestown Stamp, Dept. A48PS, Jamestown, N. Y.

PENNY Approvals. Thousands. Bargains for pennies. Gifts with purchases. Penny Stamps, Orange 2, California.

SUPERIOR worldwide mission mixture. Amazing variety! Half pound \$1.60 postpaid. Bay Nielsen, 4545A Harvard, Montreal 28, Canada.

STAMP Collecting Outfit. Includes packet worldwide stamps, package hinges, watermark detector, millimeter gauge. Everything 10c with approvals. Lorrain Brown, Marion, Michigan.

FREE Stamp Collection. 100 different stamps from Europe, Africa, Asia, Scandinavia, Balkans, etc. 3c to approval applicants. Tatham Stamp Company, Springfield 50, Massachusetts.

SEND two dimes for the best U.S. catalogue you have ever received. New-Way Stamp, Lawrence, Mass.

FREE U.S. Stamps. 1943 Flag, Commemoratives Included in Collection of 25 Different. Plus Valuable \$5.00 Stamp. All for 10c Mailing Charge. Approvals. Willett Co., Box 338-T, Yorktown Heights, N. Y.

FREE! Giant Bargain Catalog—New Edition listing thousands of bargains including U.S. and B.N.A. stamps, packets, mixtures, albums, accessories and supplies; sent with beautiful approvals. Jamestown Stamp, Dept. E48PS, Jamestown, N. Y.

50 DIFFERENT China 10c with approvals. Plymouth, Department A-4, Bell, California.

FREE—Valuable USA! (1) Scarce genuine postage stamp picturing first USA, issued in 1847! (2) Big collection 30 all-different U.S.; ancient 19th century, valuable \$1.00 stamp, etc. (3) Collection beautiful Commemoratives. (4) Collectors Guide; Big 64-page Bargain Catalog including all U.S. Postage Issues; other exciting offers! Send 10c for mailing expenses. Harrisco, 4165 Transit Bldg., Boston 17, Mass.

100 DIFFERENT Stamps. 10c with approvals. Smith, 508U Brooks, College Station, Texas.

GIANT Approvals. Thousands Different 1c and 2c each. Wahl's Stamp Exchange, 7008K Farragut, Chicago 31, Ill.

OLD scarce U. S. seconds on approval. Slightly defective, bargain prices. Hearnfeld, Clintonhill Station, Newark 8, N. J.

1,000 DIFFERENT, \$1.00 with approvals. Golden's, 6721 Eastwood, Phila. 49, Pennsylvania.

100 ALL Different Mint United States Commemoratives \$6.75 Includes Bicentennials, Parks, Famous Americans (No Approvals). Gil's, Box H12, Brooklyn 29, New York.

50,000 STAMP Grab-Bags, 25c each. Anderson, Box 1, Reading, Pa.

WORLDWIDE, 50 all different, absolutely free, just to introduce our incomparable approvals. Kent Stamp Company, GPO Box 87, Brooklyn, N. Y.

U.S. Classics—Over 50 Yrs. Old. 15 Selected oldtimers. Missing in biggest collections. All 15 at less than 1c each. 10c with approvals. Jaro, Box 246-P, New York 8.

VIET-Nam Elephants plus 33 Foreign 10c. Approvals. Coley, 3606 Lazywood, Houston 23, Texas.

FREE United States Commemorative List. H-S, 45 Bromfield, Boston 8, Massachusetts.

64 PAGE U.S. Catalog Free. Stone, 192 Washington, Boston 8, Mass.

GIANT Stamp Zoo Free! Snakes, Leopards, Rhinoceros, Zabu, Koalabear and other fierce jungle beasts. Approvals. Send 10c for handling. Free stamp magazine. Lincoln Stamp Co., St. Catherine's 119, Ontario.

TERRIFIC Stamp Bargain! Israel—Iceland—Vatican Assortment—plus exotic triangle set—Also fabulous British Colonial Accumulation—Plus large stamp book—All four offers free—Send 10c to cover postage. Empire Stamp Corp., Dept. PR, Toronto, Canada.

DEALERS Wholesale catalog. Postage 3c. Frankso, 5031 Queensbury, Baltimore 15, Maryland.

100 DIFFERENT Belgium Free. UPU World's Fair Rotary Hi value railroad stamps free to approval Applicants. Trylon, Box 179-S, Forest Hills 75, N. Y.

FREE—Stalin Giant "Iron Curtain" Set. Approvals. Seminole, Dayton, Tennessee.

HARD To Get China Packet 10c To New Customers. Tru-Value, P. O. Box 2098-S, Santa Ana, Calif.

U.S. Stamps. Giant Bargain Catalog—10c. Raymax, 35VX Maidenlane, NYC 38.

FREE!! Set Triangles, 25 others. Approvals. Abbott Stamps, Baldwinville, Mass.

U.S. Commemorative First Day Cover Free with Approvals. Arrow Stamps, Box 2575, Oklahoma City 8, Oklahoma.

ECONOMICAL 1/2-3c Approvals, 33,000 varieties. Dresel, Box 128-T, West Englewood, New Jersey.

PENNY Approvals jammed with Bargains. For better values, try Putnam Stamp Company, Mahopac, New York

100 OLD U.S. Stamps between 1861 and 1935 \$1.00. Rousch Stamps, 51 Chestnut, Mansfield, Ohio.

CANADA—Modern collection having Scott Value of \$3.06. 76 issues. \$1.25. South Shore Stamps, 90C Oak Street, Lynbrook, New York.

1500 STAMPS. \$1.00. Good variety. On and off paper. World wide. Many pictorials. No approvals follow. Satisfaction guaranteed. Whalen, 1435 First Ave., Oakland 6, California.

AFRICA stamps 100 one dollar. Myanger, Box 142, Chingola, Rhodesia.

FREE! 25 Different Pictorials. Approvals. Marford, Box 48, Queens Village 29, New York.

50 DIFFERENT Argentina 10c Approvals. Smith, 6 Greencroft, Champaign, Illinois.

COLORFUL Pictorial Collection Free with approvals. Variety Stamps, Box 98-M, Newton Highlands 61, Mass.

WHITE Russia Set Free—Approvals. W-B Stamps, Wilkes-Barre, Pa.

UNITED States Catalog Free! Bailey Stamps, 45 Bromfield, Boston 8, Massachusetts.

40,000 VARIETIES Available on approvals 1/4c upwards. Keigwin, Box 933D, Daytona, Florida.

500 DIFFERENT World Wide, only 50c. CK Stamps, 6912 Sheridan Road, Kenosha, Wisconsin.

FRENCH large pictorials 5c. Approvals. Fabian, Box 10056, Tampa 9, Florida.

12 DIFFERENT Israel 15c. Veteran Frank Stroskey, 223 Market St., Perth Amboy, New Jersey.

QUEEN Elizabeth Mint Sets! Barbados, Virgins, Gold Coast, Gibraltar, Dominica, Malta. 21 Bicolors—25c! Beautiful Approvals. Gannon Stamps, Box 931, Canton 1, Ohio.

CHINA, 5 different airmail only 5c to approval buyers, Coast, P.O. 2187S, Santa Ana, Calif.

100 BRITISH Empire 10c, Bargain approvals. Mokwa, 2855 W. Byron, Chicago 18.

FREE Sample! Illustrated, informative, interesting. National Stamp News, Anderson, South Carolina.

100 DIFFERENT Austria 10c. Approvals. Irving Aronson, Box F, Newton Centre 59, Massachusetts.

1000 DIFFERENT Worldwide Stamps \$1.00. Valued over \$20.00. Universal, Box 6, Kenosha 6, Wisconsin.

FREE! Assortment Worldwide stamps. Bonus Offer. Approvals. Hobby, Box 971M, Newark 1, N.J.

US 19th Century special 12 different 10c approvals. Margas, 1173a East 51st St., Brooklyn 34, New York.

25 DIFFERENT Commemoratives 1893 up 10c. U.S. Approvals. K & B, Box 70, Brooklyn 23, New York.

125 DIFFERENT only 10c. Request our approvals. Royaltan, Box 283, Forest Hills 75, New York.

EXCITING "Strange countries" packet. Free with approvals! Saxon, Orange, California.

SPUTNIK. The World's first Space Satellite stamp, plus 50 all different free with approvals. Stamp Imports, Peterboro, Ontario, Canada.

FREE everything Free—Mammoth collection cataloguing \$20.00 also 50 valuable complete sets. 54 Gigantic multicolor Commemoratives. All volumes Scott's International Albums, catalogues, even Master Global Albums. Free when you buy our sensational foreign approvals. Bargain Stamps, Redlands, California.

U.S. Mint Flag Set, \$1.00. Free Price List. Brooks, 2323P Avenue X, Brooklyn 35, N. Y.

SELECT U.S. on approval. Mint, used. Kingsbury Stamps, Fairfax, Vermont.

LAOS, Viet-Nam, etc., Free! Inexpensive Approvals. R&R Stamps, Box 7, Walnut Ridge, Arkansas.

SPUTNIK and 50 worldwide stamps with inexpensive and attractive approvals. Rush dime to Taylor, 106 Prospect, Nutley 10, New Jersey.

AUSTRALIA—Fifty different exciting commemoratives. Animals, Kings, Queens. This valuable Australian Collection only 10c with approvals. Viking, Great Neck 5, N.Y.

SELECTED Fine Stamps on Approval. Beginners or Advanced. Wilson, 5028 Onstad, San Diego 10, Calif.

6 DIFFERENT Sputnik commemoratives plus 6 Geophysical Astronomy issues; just 10c with Topical approvals. Sierra Stamp Sales, 2322 Hayes, Fresno, California.

POPULAR SCIENCE OPPORTUNITIES

SCARCE Nepal, 1890 Midget, Jaipur, 203 Different, 10c; 507 Different, 50c; \$9.00 Value Armenia, etc., \$1. Approvals, Sands Company, 131 Burns Street, Hampton, Virginia.

COLORFUL Bolivia Oil Set 5c. Approvals, Stamps, Box 244, Fairmont, Minnesota.

FREE 20 Airmails To Serious Approval Applicants. Tower, Box 342, Shenandoah, Miami, Fla.

EXOTIC! Colorful! Mint, used foreign sets. Premiums given with purchases. Henderson, Lindale, Georgia.

300 DIFFERENT Given Free with Approvals, Particulars, Windsor Stamps, 8834 Cornell Ave., Chicago 17.

JUST the stamps you want. Let us show you U.S. and foreign approvals. Laclede Stamps, 4973A Columbia Ave., St. Louis 9, Mo.

A Bonanza World's Smallest Stamp Plus First Greenland Stamp Including Triangles, Pictorials, Bicolors, Totalling 104 all different stamps only 10c with approvals. Finney, Box 89, El Monte, Calif.

FREE Mint Set — Approvals Accompany. Mintco, 5151 Princeton, Memphis 17, Tennessee.

PENNIES each, 50,000 Different. Free Details. Samples 25c. James Vaughan, Gulfport 7, Florida.

UNITED States. \$1.00 buys 7 fine mints. #643, #645, #646, #651, #657, #680, #688. Approvals accompany. Whiton Paine, Westport 12, Conn.

FREE! 15 Mint French Colonies; Interesting Approvals Accompany, Tropicana, Box 624-S, Oakland Park, Fla.

FREE! Tanganyika—Nigeria—Morocco—Madagascar—Cameroon—Guadeloupe—Rhodesia—Nyassaland—Greenland—Togo—land! Send 3c Postage. Thrifty Stamp Company, Woodmoor, Silver Spring, Maryland.

CANADA, 100 different 35c with bargain approvals. K. S. Holmes, London, Canada.

TEN Sports plus 50 Different, 10c with approvals. Bennett, Candor 2, N. Y.

14,000 DIFFERENT! Amazing new plan builds your collection systematically, country by country. Only 50c weekly. Free details. L. G. Ware, Stepney 70, Conn.

60 DIFFERENT U. S., including 30 Commemoratives 25c. No approvals. Seidenberg, Appleton, Wisconsin.

25 DIFF. Egypt 5c with approvals, Radon, Box 101, Marshfield, Wis.

CLOSING Approval Business, 50% Off All Orders. Airs, Europe, Asia, S.A., U.S. P&H Stamps, Box 8598, Crenshaw, Los Angeles 8, Calif.

FREE! Bicycle Diamond—Fish Triangle. Approvals, Metcalf, 105 West Saratoga, Baltimore 1, Maryland.

1000 DIFFERENT, Worldwide, with approvals, Jacobsen, 4395-P Broadway, New York 40, N.Y.

ISRAEL 10 Different Distinctive 10c. Approvals Accompany. Rocket Valley Stamp Co.—Dept. S—Box 328, Canoga Park, Calif.

MYSTERY Bag Stamp Collection, 10c with approvals. Hill Company, Box 51, Defiance, Ohio.

THIRTY Year's Stockpiling! United States, Canada, British; Collection Approvals, Enclose 10c. Peterson, 405 Empire Bank, St. Paul 1, Minn.

SETS, Packets, Surprises with Purchases. Approvals, Stamp Farm, St. Oxford, Wis.

29 ANTIQUES, RELICS & INDIAN GOODS

SELLING 100,000 ancient Arrowheads, Spearheads, Tomahawks, etc. List free. Lear's, Glenwood, Arkansas.

SCALPING Knife, 3 War Arrowheads \$2.00. Catalog Free. Arrowhead, Glenwood, Arkansas.

THREE Arrowheads, Two Spears or Knife \$1.00. Palmer, 435 Washington Road, McKeesport, Pa.

10 ARROWHEADS \$2.00; Grooved Stone Warclub \$2.00. List 10c. Stan's, 1054 Lilley, Columbus 6, Ohio.

RARE Obsidian Arrowhead from Oregon \$2.00; Knife \$5.00; Catalog 50c. Penning, Klamath, California.

STONE arrowhead making instructions. Illustrated, complete, \$1.00. Chief Blackhawk, Box 564-D, Kennewick, Wash.

30 MINERALS & PRECIOUS STONES

EARTH Science — Rockhounds National Magazine. Subscription \$2.00. Sample 35c. Box 1357-PS, Chicago (90), Ill.

BEGINNER'S Mineral and Gem Study Sets. Free Literature. Mineral Lore, Box 155, Del Rosa, Calif.

LARGEST gem and mineral magazine tells how to have profitable fun with rocks, gems, jewelry. Monthly, \$3.00 year. Sample 25c. Gems & Minerals, Dept. S-4, Mentone, California.

GEMCUTTING — Silvercraft magazine. Learn to cut gems, make jewelry. Ads give sources equipment, gems for cutters, collectors. Free literature. Sample copy 25c. Lapidary Journal, Del Mar 3, California.

SAPPHIRE, Topaz, tourmaline, garnet, peridot. Five uncut gems, \$1.00. Bargain list. Gems, jewelry mountings, 25c. Gem cutting equipment, 25c. O'Brien's, 1116N Wilcox, Hollywood 38, Calif.

31 HOBBIES, COLLECTING

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 30-E, 635-F St., N.W., Washington 4, D. C.

A NEW World of Fascination and Enjoyment With Micro Organic Crystals. Catalog 10c or Send \$1.00 for Samples to Riklin Laboratories, Box 3295-S, Seattle, Wash.

STENCILS—12 Assorted for Textiles, Furniture, Etc., \$1.00 Catalog 300 Designs. Sample, 25c—Don Beyer Art Service, Box 326, Huntington Station, New York.

"ROCKETS"—How to build successful flying models. Complete instructions \$1.00. Greiner Enterprises, Box 3579, Hamilton Station, Baltimore 14, Maryland.

WANTED — Cigarette, tobacco cards. Write Charles Bray, East Bangor, Penna.

UNPAINTED Figurines, molds, supplies. Catalog 25c. Steece Bros., Box 177-PA, Sioux Falls, So. Dak.

CIVIL War Soldiers for the Dioramist. 32 Illustrated Pages. Catalog #10-E 35c. Bussler Miniatures, 40 Howe St., Quincy 69, Mass.

TROPICAL Fish, Color Pictures 55 Species. Send 10c. Miracle Filter Co., Box 9128-J, Long Beach, California.

COLLECTORS Matchbook covers, 100 Different unused \$1.00. Catalog 25c. Album \$3.00. Charles Edelman, 1311-P East 84, Cleveland 3, Ohio.

40 NEW military shoulder patches, ribbons, includes purple heart. Postpaid \$1.00. N. Kimmel, 10436 Cheviot Dr., Los Angeles 64, California.

COLLECT Medals! Nazi Badge 50c; Embroidered Swastika and Catalog, 25c; 35 American Emblems, 50c; Hobbies, Box 71, Rockaway Park A-94, N.Y.

31A MINIATURES

MINATURE Tools—workable, less than 1 1/4" length. Excellent workmanship; metal; well designed; gilt or bright Iridite plated. Pocket Knife; Shears; Nut Cracker; Pliers; Tin Snips, 3c each, plus 10c mailing-handling charges. 100 pieces \$2.75 postpaid. Hansens, Inc., 2721 East 11th Street, Oakland, California.

32 PHOTO FINISHING, PHOTOCOPIES, ETC.

PARTICULAR? 8 Jumbos 40c; 12—50c. Special; 35mm, 36 exposures \$1.25 Intro. Offer. Flash Foto, Box 36H, Brooklyn 4, N. Y.

FREE 5x7 introductory enlargement with roll. Finest quality Jumbo dated prints in handy super paks, 8 exposures 35c; 12, 55c. Complete color processing. Big Discounts! Write Globe Photo, Dept. PS, Box 3508, St. Paul, Minnesota.

REPRINTS 30 for \$1.00 thru May 31st. Twelve Exp. 39c. Wallets 20 for \$1.00. Lincoln Studios, Dept. L, Box 13, Lincoln, Nebr.

FAST Film Service: Black and White: Eight Exposure 40c. 12 Exposure 60c. 20 Exposure \$1.00. Reprints 5c. Kodachrome, Process 90c. Prints 32c each. Anscochrome, Ektachrome \$1.40. Kodachrome \$1.50 Mounted. Finest quality over 40 years. Mailers. Mail Order Photo Service, Box 297, Watertown, Wisconsin.

8-HOUR service on deluxe jumbo prints. 8-Exposure roll developed and 8 jumbo prints 40c. 12 exposure 55c. 16 exposure 70c; 35 mm. 20 exposure 75c. 36 exposure \$1.25. Jumbo Deckledge Reprints 4c each. Contact prints made if specified. Bay Photo Service, P. O. Box 210, Oakland, California.

FREE, Color Snapshot Folder. Offers, Lists, Mailers. Houghtons, Erving, Mass.

KODACHROME Processing, 20 exposure, 8mm. roll movie \$1.00. Anscochrome, Ektachrome \$1.00. Free mailers and price list. Nu-Color Laboratories, Box 191, Hartford 1, Connecticut.

33 MOTION PICTURES, SLIDES SOUND EQUIPMENT

FREE! Blackhawk's big new 1958 sale catalog new and used 16mm., 8mm. movies; 2"x2" color slides; used 16mm. sound projectors! Biggest stock in USA! Cameras, accessories, supplies, too! Blackhawk Films, Davenport 15, Iowa.

MOVIE Camera Film 8 mm roll \$1.50. 16mm 100' \$3.00. Free processing. Better Films, 742 New Lots, Brooklyn, N. Y.

SAVE 50%! Guaranteed-fresh color, b&w movie film! 8mm, 16mm. Free catalog! Eso-H, 47th Holly, Kansas City 12, Mo.

FREE catalog. Save \$\$\$ Fresh 8mm, 16mm B&W and color film. Home processing equipment. Superior Bulk Film Company, 442-448 No. Wells, Chicago 10.

8MM Movies, 50 ft. \$1.00—Special Offer Animals, Cartoons, Travel, Comedies. Send \$1.00. Movieland Films, Inc., 16121-S Sherman Way, Van Nuys, Calif.

RECORDERS, HiFi. Free catalogue. Carstone, 215 E. 88 St., NYC 28.

WORLD'S Largest Film Selection, Features, shorts, new, used. Castle, Official, 8-16mm silent, sound. Free bargain bulletin, specify size. Peerless Camera, 415B Lexington Avenue, New York 17.

TAPE recorders, hi-fi components, tapes. Unusual values. Free Catalog. Dressner, 69-02 174 Street, Flushing 65, New York.

16 M.M. Sound Features and shorts. Reasonable. Bedner, 5300 So. Talman, Chicago.

FREE Catalogues. 5,000 8-16MM Films. International Films, Greenvale, New York.

8MM, 16MM Films Rented—Sold. Hutton Rentals, Bellows Falls, Vermont.

16MM Sound Films, Sold, Exchanged. Duquette, 97-P Snow, Fitchburg, Mass.

KODACHROME 8mm movies, 480 frames, color sample, list: \$1.00. Filmwiz, 38441S, Hollywood 38, California.

34 CAMERAS, PHOTO SUPPLIES

FREE! Free! Send for your new 52 page Photographic Bargain Book. Over 5,000 new and used items at huge savings. For your Free Bargain Book, write to Dept. 44, Central Camera Co., 230 S. Wabash, Chicago 4, Ill.

PHOTOGRAPHY For Pleasure or profit. Learn at home. Practical basic training. Long established school. Free booklet. American School of Photography, 835 Diversey Parkway, Dept. 1724, Chicago 14.

35MM Camera—By famed German Craftsmen. Order from Importer and save. Southwestern Trader, 1306-P South Darlington, Tulsa 12, Oklahoma.

KODAK, Bell-Howell, Discounts to 40% Photo Equipment, Appliances, Free Catalog. Mailers, Box 135-PS-7, Pelham, New York.

35 MUSICAL INSTRUMENTS, SONG WRITERS & RECORDS

WANTED! Poems for musical settings. Write Songwriters' Service, Clifton, N. J.

SONGPOEMS and lyrics wanted. Mail to: TinPan Alley, Inc., 1650 Broadway, New York 19, N. Y.

POEMS wanted for new songs. Send poems. Immediate consideration. Crown Music Company, 49-P West 32 Street, New York City.

POPULAR SCIENCE OPPORTUNITIES

ACCORDIONS—Direct from importer—save 50% and more. Free trial. Lifetime guarantee. Trades accepted. Free Catalog. Write Accordion Manufacturers Outlet, Dept. 48P, 2003 Chicago, Chicago 22.

SONG poems wanted. Free examination. Send Poems. McNeil, Master of Music, 1112-PS Wilshire, Santa Monica, California.

NEW Songwriters. Songpoets share \$33 million dollars yearly. Any subject songs, poems revised, composed, published, promoted by largest firm. Information, appraisal Free from Nordyke Music Publishers, 6000 Sunset, Hollywood 28PS, California.

SONGWRITERS! Protect your ideas! Hold all poems, songs! Write for safe, correct procedure! Song Service, Dept. PS, 333 W. 56th, New York 19.

ACCORDIONS Wholesale—10 day trial. Free Catalog. American Accordion Center, 5329-PS-4 Belmont, Chicago.

SONGS published free. Get information. Northland, 2720A N. 35, Milwaukee 10.

VIOLINMAKERS supplies. Free Catalog. 309 W. Fourth, Los Angeles 13, Calif.

COMPLETE Music Service for Amateur Songwriters. Jerry Colonna, Box 888S, Burbank, Calif.

POEMS Wanted for New Songs and Recording. Immediate Consideration. Send Poems. Songcrafters, Box 6145, Acklen Station, Nashville, Tenn.

MAGAZINE, old rare phonograph records, 24 pages, 6 introductory issues. \$1.00. Record Research, 131 Hart, Brooklyn 6, New York.

ELECTRIC Guitars, amplifiers, wholesale. Free catalog. Carvin, PSM, Covina, California.

PLAYER Piano Rolls. Top Tunes. Old Timers. Classics, etc. Free List of Selections. Worth & Co., Box 173, Muskegon, Michigan.

MELODIES furnished on 50-50 basis. Records, protection. National Songwriters' Guild, 16D Ocean Shore Drive, Ormond Beach, Florida.

TUNE Your Own Piano. Tools and instructions, including Tuning wrench. \$9.75. Nelson Co., Box 707, Gilroy, Calif.

SONGWRITERS: Recording Company Wants new songs. Royalty basis. National sales, promotion if selected. No charge for melodies. Send material. Music Makers, Dept. G-34, Box 2507, Hollywood, California.

36 RADIO, TELEVISION, SUPPLIES & EQUIPMENT

FREE! Giant Bargain Catalog. Transistor, "Sun" Radios, Kits, Portables, Audio, Electronics, Photographic, Optics, Tools, Household. Write Lektron, 131S Everett Ave., Chelsea, Massachusetts.

GUARANTEED Recording Tape, 1200'—\$1.39 1800'—\$1.99, 2400'—\$3.99. On 7" Reels, Empties 7"—35c. Minimum order assorted \$10. Sanmar, Box 295, Bloomfield, New Jersey.

GOVERNMENT Surplus—Radios, Mine Detectors, Radar, Sniperscopes, Parabolic Reflectors. Amazing Picture Catalog—10c. Meshna, Malden 48, Mass.

CRYSTAL radios, completely assembled, \$1.25 postpaid. Engineered construction for best reception. Engineered Products Company, Springboro, Ohio.

RADIO & TV Tubes. Most all Types. 99c each Postpaid. 6423 Broad, Brookmont, Maryland.

RADIO Course only \$22.95. Includes all tubes, parts, tools, instructions. Write for full information. Progressive "Edu-Kits" Inc., Dept. 553A, 497 Union Ave., Brooklyn 11, N. Y.

EVERYBODY'S Tube and Set Tester. Complete Ten Dollars. Literature Free. Stegotronics, Colchester, Connecticut.

KITS: Shortwave Radio \$3.50—Improved Crystal Radio 75c. Alliance, 2059 60th, Brooklyn 4, New York.

CRYSTAL—Radio experimenters. Write to Hulet, 305 Hope, Lakewood, New Jersey.

NEW Disappearing television antenna. Eliminates "Rabbit Ears"—\$3.95. TVI Company, Box 21, Lafayette Hill, Pa.

CRYSTAL Radio kit \$1.00, preassembled \$1.25, phone \$1.75; catalogue. Clearco Crystal Company, 2966 North 4th, Milwaukee 12, Wisconsin.

37 BUSINESS OPPORTUNITIES

OPERATE profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

FIX Typewriters. Inexpensive home course teaches Factory Secrets. Free Booklet. Write, Typewriter, Tarentum 2, Pennsylvania.

WHOLESALE—Get the big merchandise—furniture, appliances, TV's, clothing, tools, auto accessories—most anything. Save half. Literature Free. Associated Wholesalers Service, 1016-C Starr, Burlington, Iowa.

"MAILORDER Laws and Regulations" and "Mailorder Rules for Beginners." Learn about necessary licenses, different taxes, legal requirements, etc. Both books, \$2.00. Tasker, Box 3131, Alexandria, Va.

\$70 WEEKLY—Home, spare time. Simplified mail bookkeeping. Immediate income—easy! Auditax, 34757D, Los Angeles 34.

11,000 NEW Prospects Daily. Baby record books, shoes, albums. Sell mailorder. Use our literature. Write: No-Co-Ro, Capitola, California.

YOUR envelopes addressed accurately, reasonably. Fast service. We have capable addressers in your city. Glenway System, Box 6568, Cleveland 1, Ohio.

BRUSH Plating Outfits for plating articles in the home and shop. No tanks necessary. Silvering Mirrors spare or full time. Free particulars. Gunmetal Co., Ave. E, Decatur, Illinois.

PLATE Baby Shoes, jewelry, gifts, bronze and colored pearl. Free Booklet. Anderson, 11029 South Vermont, Los Angeles 44.

\$250.00 WEEK spare time profit possible. Earn at home with new fascinating Printing method. \$5 starts you—send no money now. Free Confidential Facts and Valuable Samples. Screen-Print, AL, Los Angeles 61.

MAKE Extra Money. Cash commissions. Everybody buys easy-to-sell Advertising Book Matches. Union label. Big variety—Glamour Girls, Scenics, Hillbillies. Powerhouse selling kit Free. Steady repeat business. No experience necessary. Superior Match Company, Dept. PX-458, 7528 S. Greenwood, Chicago 19.

YOUR Own name brand business. No investment; no inventory. Part time or full time. Sell famous brands of appliances, housewares, silverware, radios, vacuum cleaners, lamps, tools, clocks, watches, jewelry, etc., etc., over 1,000 items. Join thousands of successful independent dealers. Send for Free catalog and dealer price list. H. B. Davis Corp., Dept. 14, 145 W. 15 St., New York City.

LEARN Photo-Negative (Portrait) retouching. Men, Women \$5 hour possible spare or full time at home. Easy, glamorous. Work for Photographers by mail order. Full details sent Free. Duval, 100 South Vermont, Los Angeles 4.

HOME-Import Mail Order Business—Import profitable items below wholesale. Experience and product investment unnecessary. Full spare time. Famous world trader guides you. Free list "157 imports," details. Mellinger, P-694, Los Angeles 24.

MAIL Order—advertising agency executive reveals sensational no-risk advertising and merchandise methods. Start in office or home—minimum capital—positive profits. Free details; Impact! 3407 Prospect Ave., Dept. 2-4, Cleveland 15, Ohio.

900% PROFIT. Own your own exclusive business. Instructions (including samples) \$1.00. Charles Company, 12-BFR, Norwood, Ohio.

FREE Catalog. Contains hundreds of businesses, farms and income properties throughout U.S., Canada. Specify type and location desired. Deal direct with owners U.I. Buyers Digest, 1608 Hillhurst, Dept. PS-1, Los Angeles 27, Calif.

LET Me Sell Your Products Nationally. I'll Send You Free Information On How To Establish Sparetime—Full Time Casecraft Business. You Build! We Sell! Everything Supplied. Abarsi, 807-WK Sunset, Los Angeles 78.

BECOME Tax Consultant. Graduates earn to \$3,000 every tax season preparing returns evenings. State approved. Union Institute, Hoboken 1K, New Jersey.

"50 NEW Home-Business Ideas" Booklet, sample Free. Spray exotic Velvet-Suede on anything. Flockcraft AL, Los Angeles 61.

GROW Orchids at home. Profitable, fascinating. Successful home grower explains special light, temperature and humidity conditions orchids need. Free—Full details. Orchids, 100 S. Vermont, Los Angeles 4.

\$100.00 WEEKLY spare room. Raise redworms soilless way. Odorless. Charlie Morgan, Box 116C, Bushnell, Florida.

QUICK profits, with no capital! Take orders for magazines your neighbors like, want. Make cash on the spot! We show how with Free kit. Get yours now. Write McGregor Magazine Agency, Dept. 340, Mount Morris, Ill.

WANTED—Limited number intelligent Men and Women to work at home on exclusive Mail Order Business proposition. No selling—we furnish everything including literature, names, addresses, stock and ship items for you. Free Details. Mail Order Distributors, AL, (Franchise Division), Los Angeles 61.

BE appointed state notary public now. Write—Stationers, Boerne, Texas.

PLASTERCRAFT molds. Liquid rubber, plasters, flocks, candle supplies. Catalog and manual free. Jayhawk Plasters, Blue Rapids, Kansas.

LEARN Mailorder Selling. Pays Big! Free Colliers' Reprint! Elliott, 216-B W. Jackson, Chicago 6.

WANT To Make Big Money At Home? \$10.00 profit in an hour possible with Invisible Mending. Make tears, holes, disappear from clothing, fabrics. Steady year-round demand from cleaners, laundries, homes. Details Free. Fabricon, 6244 Broadway, Chicago 40, Illinois.

FULL Part Time Franchise Dealers. Financial Recommendation Service. Complete Report \$5.00. Box 1442, Bridgeport, Conn.

MAKE Money Writing Short Paragraphs. Information Free. Barrett, Dept. CX-28, 7464 N. Clark, Chicago 26.

IMPORT Mail Order Business. New Directory lists over 400 manufacturers, exporters of the world. Complete import procedures, international drop ship methods. Capital unnecessary. Free details. Associated, Box 52-P8, Burlington, Iowa.

METALIZE Baby Shoes; Repair Dolls; Rebuild Batteries; Catalogue "75 Ideas" Free. Universal, Box 1076-B, Peoria, Illinois.

OPPORTUNITY to earn \$15,000-\$30,000 annually. Franchise protected. Granted on \$12,500 basis. Live at home. No merchandise to buy. Selfemployed. One of most exclusive and noncompetitive Businesses in United States and Canada. Send for free explanatory booklet. Harrell and Company, Box 8-D, Louisville, Illinois.

TO \$100.00 weekly. Sparetime, home operated mailorder business. Successful "Beginner's" plan. Everything supplied. Lynn, 10420-C National, Los Angeles 34.

VENDING Machines—No Selling. Operate A Route of Coin Machines And Earn Amazing Profits. 32-Page Catalog Free. Parkway Machine Corporation, Dept. 18, 715 Ensor Street, Baltimore 2, Maryland.

INCOME from local information. No Selling. Write Neherco, LaVerne, Calif.

FREE picture folder, "How to Make \$3,000 Yearly Sparetime, Backyard, Raising Earthworms!" Oakhaven-42, Cedar Hills, Tex.

MINK Raising information free. Complete. Lake Superior Mink Farm, Superior E E5, Wisconsin.

DEMONSTRATE Fascinating Sign System. Straley Signs, 410 Western, Springfield, Ohio.

NATURAL Molding Rubber; Extra Thick. Free Sample. W. Wooley, 1016-B Donald, Peoria, Illinois.

PATRICK paid for his home sharpening saws with Foley Saw Filer. Mix made \$900 year sparetime. Crego files 1,000 saws yearly. Make \$3 to \$5 hour at home. Free book tells how. Charles G. Foley Co., Columbia Heights, Minn.

POPULAR SCIENCE OPPORTUNITIES

START home mailorder bookshop, immediate wholesale proposition. Smelser, Troy, Missouri.

AMAZING New Plan Free! "How To Retire At Age 21." Men or Women Over 21 Can Retire Now. Shows how you can prepare for life of leisure if you're under 21. Bob Belmont, Box 258, Hawthorne 5, N. J.

PROFIT with Bestest Tube Testers! Cater to do-it-yourselfers. Customers test own radio and television tubes, you sell replacements. Net \$50.00 monthly per machine. Bestest Tube Testing Company, 19963 Livernois, Detroit 21, Michigan.

SELL luggage Carriers for Station Wagons. Profitable. No investment. Canell, Little Ferry, N. J.

WE Pay \$3.50 lb. dried. Grow Mushrooms. Cellar, shed and outdoors. Spare, full time, year round. We have 25,000 customers. Free Book. Washington Mushroom Ind., Dept. 178, 2954 Admiral Way, Seattle, Wash.

"COOLIE-Grinderlap" with "Re-Lod-Able Diamond Wheel" sharpens carbide tools and drills to keenest edge. Cheapest and best. Home-Shop or Factory. Terms like rent. Instructions free. Write DTCO., Sheldon M. Booth, Box 32, South Haven, Michigan.

GROW a living Miniature Forest or orchard (only inches high), that bears tasty tiny fruit at home. Learn amazing Dwarfing secrets! Fascinating hobby. Profitable Home-Business Opportunity. Free Seeds and Plan. (State your age). Miniature Nurseries, Dept. AL, Gardena, California.

START Home Mail Order Business! We Supply Everything—Fill Your Orders—Guide you. Write: Rogers, 2954B, Pennsylvania Ave., Charleston, W. Va.

INVISIBLE Reweaving: \$5 in one hour possible reweaving burns, tears, mothholes. Spare-Full time. Free Details. Skill-Weave, Dept. C-134, 335 W. Madison, Chicago 6.

FOR Better Income send for Free details. United Empire Service, 2291 Broadway, New York 24, N. Y.

FREE "Franchise Profit Letter" describes Nationwide Opportunities. Exclusive Distributorships. Dealerships. Agency Operations. Write Today. National Franchise Reports, 333 North Michigan, Chicago 1.

IMPORTING. Modern dropship method. Details free. The Hazen Company, 6601S 8th Avenue North, St. Petersburg 10, Fla.

MARKETS Everywhere. Make Artistic concrete birdbaths, pottery. Chemical coloring. Home workshop. Hundred varieties. Hollywood Cementcraft, 8527-F Wonderland, Hollywood 46, California.

MAILORDER! Easy Way. Professional. Inexpensive. Fosters, Box 8382-F, Albuquerque, New Mexico.

LIQUID Rubber. Make flexible molds. Free Sample. Chaney, 1907-C East Rd., Jacksonville 11, Fla.

FREE Literature—Make Big Money Raising Fishworms and Crickets. Carter Farm, Plains, Ga.

BUY Direct From Factories—Appliances, Cameras, Watches! Free details! Cam Company, 6810PS-20th Ave., Brooklyn 4, New York.

EARN \$10,000 Yearly Raising Angora Rabbit Wool for Us. Information 25c Coin. American Angora Company, Malta 1, Montana.

OBSERVER television. Excellent profits. \$2,000 investment. Telcamera, Box 301, Margaretville, New York.

MOST exciting sound, moderate-capital mail order opportunity. Exclusively yours. Different, dynamic! Hundreds successful. For details, proof, write E. R. Slater, 305 W. Eighth, Los Angeles 14 Calif.

SELL Books By Mail. 400% Profit. Royal, Box 368-M, Cleveland 27, Ohio.

GROW Expensive herbs for us! Big profits home-business of your own. Year around profitability! We supply everything necessary! Send for free rare seeds and revealing plan. (State your age.) National Herb Exchange, Dept. AL, Gardena, California.

\$34.70 TWO Hours. Manufacturing. No Selling. Carlayn Castings, 1803 Fremont, Rapid City, So. Dakota.

OPERATE profitable mailorder business! Free details. Thomas Bond, 1637-R West Vernon, Phoenix, Arizona.

MAKE \$200.00 Monthly Spare Time With Jigsaw. Free Details. Elkman, 346 N. Summit, Sioux Falls, S. Dak.

100% PROFIT. No Investment. Stamp brings details, samples. Miller, Box 584, Brooklyn 1, New York.

WANTED. Men, Women, raise bait for us at home. Full, spare time. Doesn't take up space. We furnish everything. Bait Associates, Dept. M-8, Stetson, Maine.

PIANO Tuning learned quickly at home. Tremendous field! Musical knowledge unnecessary. Information free. Empire School of Piano Tuning, Champaign, Illinois. (Founded 1935.)

MAKE New Greaseless Doughnuts In Kitchen. Sell stores. Free recipes. S. Ray, 3605 South 15th, Minneapolis 7, Minnesota.

READ "Do-It-Yourself Mailorder Business." Easiest moneymaking opportunity imaginable. 25c postpaid. Tasker, Box 3131, Alexandria, Virginia.

REPAIR Bicycles in spare time. Wholesale Price List—Information. Albert Lam-born, Box 271, West Chester, Pa.

EARN \$10,000 Yearly—only two sales daily. World's Best Seller, The Holy Bible (Illustrated) Protestant or Catholic. Margareta's, P.O. Box 92, Hazleton 6, Pa.

MAKE flexible molds. Cast plaques, figurines. Free sample. Tooker, 1045-A Fairview, Hamilton, Ohio.

CASH from Sawdust, Tin-cans, Newspapers. Over 200 methods. Instructions \$1.00. Charles Company, 12-XBF, Norwood, Ohio.

SELL Wholesale! Appliances, Jewelry, Houseware, etc. Individuals or retailers. Factory Sources: \$2.00. Davis Enterprises, 1305 Paul, Norfolk 5, Va.

"EVERYBODY Likes Candy"—Make Professionally Home . . . (Our 48th Year.) Ragsdale Candies, D107, East Orange, New Jersey.

WANTED: 1000 Homeworkers for home mailorder operation. Dime rushes Catalog. plans, Steinbergen, 1274A Stebbins, NYC 59.

\$250 WEEK reported! Free book "505 Odd, Successful Businesses." Work home! Expect something Odd! Pacific-36C, Oceanside, California.

MAKE Money; address, mail, new self-selling catalog. Big profits; no stock to carry. Free details. Tri-State, Box 8008, Huntington, W. Va.

CAMERA owners! Earn \$50 weekends! Instructions \$1.00. Information free! Kline, 935-PS North Austin, Chicago 51, Illinois.

MUSHROOMS Quicker, Easier, Cheaper. Newest Facts Free. Spawn \$1.00. Luxorco, 641 South 19th, Newark 3, N. J.

MAKE Strange plastic building material of waste, easily. Water, fire, wear and termite resistant. Bays Laboratory, Arkansas City, Kansas.

\$5,000 OR \$20,000 Yearly Without Work Or Risk!! Virtually unknown! Every (safe) dollar invested returns up to \$150. Value increases constantly. \$200 investment (1950) now worth \$5,700. Invest several dollars or thousands. Don't lose this "gold mine" to skepticism. Details \$1.00. John Kratz, Bowmansdale 17B, Penna.

\$6,000 FOR Mister, Mrs.: \$3,500! Free "Secret Journal" Plan. Magical! Work home! Publico-N33, Oceanside, Calif.

MAKE \$50,000 Yearly From Home. Informative Plans Free. Fortune Enterprises, Addison, Illinois.

STOP Wrinkles. Mystic Secret \$2. Instruct Others. Details. Ernela Gardiner, 330 East 257 St., Euclid 32, Ohio.

MAIL newspaper clippings daily for cash. Ketchum's Advertising, 1058-B, Springfield, Illinois.

MAKE Big Profits clipping newspaper items for publishers. Instructions explain how. Particulars free. National, 81-N, Knickerbocker Station, New York.

IMPORT clothing appliances, tools. Complete addresses 25c. States, Culloden Road, Stamford, Connecticut.

\$600.00 PROFIT. Mailing 100 catalogs! Catalogs feature items paying You up to 85c profit on \$1 items. Work from your Home or Office. No need to carry stock. We drop ship. Start Immediately! Send only \$1 (cash, check, Money Order or stamps) for 10 catalogs, or 25c for Sample. Free instructions included. Costar's, G.P.O. Box 972-PS, New York 1.

FREE Folio "\$5,000-\$45,000; Unlimited Vacations." No merchandise. Unknown! Work home! Haylings-S-16, Carlsbad, Calif.

LIQUID Marble—Colorful, glossy! Molded, brushed, sprayed! Cast Novelties, Statuary. Composition floors, tile. Flexible Molds. Particulars free. Marbleizing Service, Edwardsville, Illinois.

MAKE \$46 From Square Foot Plywood; Jigsaw necessary. Free Details. Woodarts, Bridgewater, Mass.

AMAZING Profits making concrete drain tile! Patented machine can pay for itself first day! Write: Ceeten Products, Cornelia, Georgia.

START profitable home mimeographing service! Our exciting secret plans reveal how. Write: Mozelle Mimeo Shop, Bonham 5, Texas.

STEADY home income, stenciling simple monograms. Fast, easy process. We start you. Co-art, 111 Cronkhite, Danville, Illinois.

COLORGLAZED Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "Minnesota."

IMPORT Your Own Fast Selling Products In Small Lots. Also start highly profitable mail order business using International Drop Shipment Method. Capital unnecessary. Free Details. Overseas Trading Co., 137-8 College Street, Macon, Georgia.

38 MONEYMAKING OPPORTUNITIES

SELL Titania Gems; far more brilliant than diamonds. Catalog 10c. Diamonite, 2420-S 77th, Oakland 5, California.

DETECTIVES—Work home—Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 86th, New York 24.

\$1,000.00 MONTHLY for 27 Years! Stay home and enjoy life with most fascinating mailorder business ever conceived. Mailman has put over \$250,000.00 into one mailbox under this plan. Learn how you too can start, now. Free facts. Business Specialties, Box 3065, Daly City, Calif.

EARN cash at once, sending us easy orders for magazines your friends, neighbors want. Instant profits! We show how. For Free kit, everything you need, write McGregor Magazine Agency, Dept. 350, Mount Morris, Ill.

\$1 TO \$20 Checks daily! Write simple sentences, paragraphs, poetry for pay! No experience necessary. I tell you What to Write—How to Write—Supply large list of Buying Editors. Begin Writing For Pay—Today! Will Herman, 1726 W. 25th St., Cleveland 13, Ohio.

BUY Wholesale! 30-80% Discounts! Appliances, Gifts, Typewriters, Tools, Watches, Sporting Goods, Jewelry, Cameras, Housewares, etc. Consolidated Distributors, Clifton 11, New Jersey.

MAIL-Order Beginner's Manual, laws, sources, etc., 25c. Gavin, Box 787, Troy, N. Y.

SPARETIME Repeat Profits Taking Magazine Subscriptions, Special Offers. Cassell Agency, Boynton Beach 7, Florida.

MAKE thousands yearly spare time no investment! Send today!! for Barbecue Business and party guide. Recipe book, also special sauce formula. Only \$4.99. Write Barbecue, 540 Ventura, Orlando, Fla.

MAKE \$5,000 yearly sparettime raising mink, chinchillas, nutria, etc. Free booklet reveals proved plans. Write: Furs, 588 Mt. Pleasant Road, Toronto 2, Canada.

POSITIVELY No Selling. I made \$20,000 in one year without any selling whatever. I bought up junk jewelry. Uncle Sam paid me 35c an ounce for the gold in it, less small refining charge. Get my "\$20,000 a Year Secret" Free. Leslie Patton, 335 W. Madison, Dept. C12-G, Chicago 6.

POPULAR SCIENCE OPPORTUNITIES

DISCOUNTS To 92%! Appliances, Watches, Housewares, Gifts, Turners, 2105-A Central, Alameda, California.

NATIONALLY Known Bureaus Need Part Time Workers Now! Earnings to \$100.00 Monthly. Assignments Completed Typing or Longhand. Enclose Stamp For Details. Post Service Bureau, Rice Lake, Wisconsin.

RECEIVE big mails, samples, offers, catalogs. One whole year 25c. Marten Company, 5345 South Halsted, Chicago 9, Ill.

VENDING Machines—No Selling. Operate A Route of Coin Machines And Earn Amazing Profits. 32-Page Catalog Free. Parkway Machine Corporation, Dept. 19, 715 Ensor Street, Baltimore 2, Maryland.

\$35.00 WEEKLY addressing envelopes. Instructions \$1.00 Refundable. Adservice, Spring Valley, New York.

"PROGRESSIVE Mail Trade" Has Many Moneymaking Opportunities. Sample 25c. Donovan, 79-PS Greenbelt, Levittown, N. Y.

SELL Yourself, Sell Neighbors Aluminum Awnings Wholesale. Save 50%. Groff Awnings, Fairland, Indiana.

FREE Literature—Make Big Money Raising Fishworms and Crickets. Carter Farm-11, Plains, Ga.

START Home Mail Order Business. I Made Enough Money to Retire. Now Own \$18,000 Home, Drive Cadillac. Have Money in Bank. Amazing Facts Free. N. Cole, 217 49th Street West, Bradenton, Fla.

AMAZING Successes Through Franchises! Become Exclusive Franchise Holder Your Territory. Information Rushed. National Franchise Reports, 333 North Michigan, Chicago 1.

HOTTEST Mail Order Plan Ever! Sell photos, films, art novelties. Huge proven profits! Free Details! Profits Unlimited. Dept. 2H, 15015 Ventura Blvd., Sherman Oaks, Calif.

WE Pay \$3.50 lb. dried. Grow Mushrooms. Cellar, shed and outdoors. Spare, full time, year round. We have 25,000 customers. Free Book. Washington Mushroom Ind., Dept. 179, 2954 Admiral Way, Seattle, Wash.

MAKE Money Writing Short Paragraphs! No tedious study. I tell you what to write, where and how to sell; and supply list of editors buying from beginners. Many small checks add up quickly. Write to sell right away. Send for free facts. Benson Barrett, Dept. C86-R, 7464 Clark, Chicago 26.

DOLLARS Every Day! Amazing Magic Mailorder Plan. Setup Free. Miller, Box 588-A, Oshkosh, Wisconsin.

\$15,000. PROFIT in One Year Possible, on \$5.00 cash and just 3 hours attention weekly! Experience unnecessary! Fabulous but true! Proof, complete detailed Plan, only \$1.00—satisfaction or refund! Columbia Enterprises, 8203-S Grubb Road, Silver Spring, Maryland.

NEVER forget birthdays, anniversaries, important dates. Keep no records. No memorizing. Our method guaranteed. Send Dollar Bill. Refunded on request. Marten Company, 5345 South Halsted, Chicago 9, Ill.

SENSATIONAL summer money-maker! "Mitey-Tite" plastic caps, 6 brilliant colors, sell on sight! For all opened soft drink bottles. Plain or imprinted. Personalized or business. Free samples, details! Take orders at once! Heman Ely, Jr., Box 62, Lancaster, Penna.

MAKE 100% Profit Every Time You Push A Button! Quickie Spray shines all shoes instantly without daubing, buffing, brushing. Be first! Rush refundable dollar for demonstrator, selling kit. Franchises available. James R. Barnet Co., Dept. PS-488, Wellesley Hills 81, Mass.

MAKE Money, Mailing Sample Business Cards. Vosacek Printing, 4444PS Ute, San Diego 17, Calif.

MEN — Women! Start Money-Making Plastic Laminating Business at home in spare time. Material that costs 11c brings back \$2.58. No canvassing or selling but mail orders bring in \$20 a day. Write for full particulars Free. Rush name on postcard to Warner, Room CL-3-D, 1512 Jarvis, Chicago 26, Ill.

\$30-\$60 WEEKLY sparetime addressing envelopes, typing or handwriting. Instructions \$1, refundable. Reiss, 210 Fifth Ave., Suite 1102-S, New York 10.

HAVE more money without extra work— by preventing common losses, avoiding hidden costs in daily living. New guidebook tells how. 14 sections; 200 practical pointers. Only \$1.00. Information free. Visor Publications, 19-B Brooks Bldg., Ann Arbor, Mich.

RETIRE Quick with Plenty. I did. How? Mail \$1. Capt. Wm. Lewis, Box Tampa 9, Florida.

OVER one hundred ways to make full or spare time money at home. Send for Detailed Information free. Expect something different. Wheeler, 321-3MPS, Rethke Ave., Madison 4, Wisc.

DISTRIBUTORSHIP Openings Avail- able. Fascinating Moneymaking Mailing Business. Powell's, Bx-583, Portsmouth, Virginia.

FREE Folio. "\$5,000-\$45,000; Unlimited Vacations." No merchandise. Unknown! Work home! Haylings—S16, Carlsbad, Calif.

MUSHROOMS Quicker, Easier, Cheaper. Newest Facts Free. Spawn \$1.00. Luxorco, 641 South 19th, Newark 3, N. J.

CASH for your snap shots, photographs. Your camera a gold mine. Where and how to sell. Groveland Sales Agency, Holly, Mich.

FREE "4,000 Word Report" On New Depression-proof Business Opportunities. Fortune Enterprises, Addison, Illinois.

FAST Profits the Easy Way! Make and sell costume jewelry. Details free! Write Modern Craft, Box 11088-FP, St. Petersburg 33, Florida.

BIG Money Earned While Asleep!! Neighbors think I struck Oil! Unbelievably easy. Details \$1.00 (refundable). Grant, Grantham 1, Penna.

SECURE paying homework. Sources, essential facts supplied. 50c. Peterson's, 4030-M East 14th, Des Moines 13, Iowa.

MAKE Money Clipping Newspaper Items For Publishers! Detailed plan. Newscraft, PS-983-E, Main, Columbus 5, Ohio.

MAKE Big Profits clipping newspaper items for publishers. Instructions explain how. Particulars free. National, 81-N, Knickerbocker Station, New York.

STEADY home income, stenciling simple monograms. Fast, easy process. We start you. Co-art, 111 Cronkhite, Danville, Illinois.

\$50.00 WEEKLY possible distributing wholesale catalogs. No merchandise selling. Roe, 1657S Gregory, Chicago 40, Ill.

38A BUY IT WHOLESALE

LARGEST Wholesale Supply Source In U.S. Get 23 free catalogs. Furniture, clothing, appliances, autos and accessories, farm equipment, tools, housewares, hobby supplies. Free details. Associated Wholesalers, Box 52-C, Burlington, Iowa.

BIG Multicolor Wholesale Catalog! Housewares, appliances, clothing, silverware, cookware, luggage, binoculars, radios, phonographs, cameras, recorders, projectors, typewriters, shavers, sporting goods, toys, tools, sewing machines, watches, jewelry. Name brands. Huge discounts. Postcard: Selbyco, Decatur 167, Illinois.

FREE Wholesale Price Catalog. Swiss Watches at Swiss prices. Appliances, Books, Jewelry, Cookwares, Tablewares, Cutlery, etc. Discounts to 80%. Tony Distributing Co., 135-B So. 13th Street, San Jose, California.

WHOLESALE Price List Free! Save 50%! Appliances, Cameras, Sporting Goods, Housewares, Hardware, Jewelry, Clothing, Gifts, etc. Buy-Rite, Hawthorne 64, New Jersey.

BUY Wholesale! 25,000 Nationally Ad- vertised Products. Get Amazing Dealer Catalogs. Complete Details Free. American Wholesalers, 1841-G Levee, Dallas 7, Texas.

WHOLESALE Cushion Vibrators \$22.72, free literature. "Vibrators," P-2569 North 12th Street, Milwaukee 6, Wisconsin.

WHOLESALE! Appliances, tools, cloth- ing, etc. Free catalogs! United Wholesalers, 1265-P Broadway, New York 1, N.Y.

BUY Direct from manufacturers and wholesalers hundreds of new profitable money making products. Directory \$1. Business Consultants, Box 322, Bayonne, N. J.

\$1,000.000 SALE on housewares, sewing, tools, jewelry, optics, photographic, sun radios, electronics, hi-fi. Free catalog. Write Lektron, 133S Everett Ave., Chelsea, Mass.

BUY Wholesale! Save 30-80% on Name Brand Appliances, housewares, Watches, Tools, Cameras, Phonographs, Radios, Sporting Goods, Jewelry, Typewriters, etc. Catalog \$1.00 Refundable First Order. Worth Wholesale, Worth, Missouri.

ELECTRIC Guitars, amplifiers, whole- sale. Free catalog. Carvin, PSW, Covina, California.

\$35.00 DAY Selling Stores Novelties. Free lists. Burke Associates, Manchester 2, Mass.

39 FORMULAS, PLANS, ETC.

FORMULAS—All kinds. Latest products. Literature free. Kemico, Park Ridge 15, Ill.

FREE. Large Formula Catalog. Big Surprise. Western Chemical, Salem, Oregon.

10,000 AUTHENTIC formulas. Lists, valuable information free. Brockway, Gage Building, Topeka, Kansas.

SPECIAL Formulas for latest money- making discoveries. New! Good! Profitable! Valuable Literature Free! Miller, Chemist, 1517-N, Tampa, Florida.

LATE Modern Manufacturing Formulas List Free. Chemical Service, Martville, New York.

40 PLASTICS

LEARN Plastics Fabrication For spare time income. Low cost home training now available. Write for free booklet. Interstate Training Service, Dept. D-2, Portland 13, Oregon.

NEW Liquid Casting Plastic, clear, col- ors. Embed real flowers, coins, photos. New Manual shows fine things you can make at home and sell at big profit. Send 25c. Castolite, Dept. D-102, Woodstock, Illinois.

LAMINATING Supplies. Price List Free. Solomson, 46 Cornhill, Boston 8, Mass.

AMAZING Foam Plastics—Manufacture Toys, Cushions, Mattresses, Insulation. Expands Approximately 30 Times Original. Send \$3.00 for sample chemicals, hand mixing instructions, applications, prices. Foam Products, P. O. Box 427, Warner Robins, Georgia.

FOAM Plastic for Flowercraft. Free Samples. Novafoam, 1015 Willow, Niagara Falls, N. Y.

PLEXIGLAS — Any thickness — Clear — Colors — Cut to size — Clear Rods — Tubing. McClarin Plastics, P.O. Box 168B, Hanover, Pennsylvania.

PLEXIGLAS, Acetate, Vinylite, poly- ester, Fiberglass, Epoxy, Styrofoam, mold materials. 28-Page instructive informative wholesale-retail catalog, 25c. Gem-O'-Lite, 5527 Cahuenga, North Hollywood, Calif.

PLASTICS! Casting, Molding, and Mod- eling. Complete Outfits, Molds, Jewelry, Accessories. Send 25c for Catalog and Beautiful Plastic Novelty. Castacraft Corp., Dept. S480, P.O. Box 555, Palo Alto, California.

CAST, Embed, Laminate. Your ideas into dollars. Thousands of products easily made. Over 70 Materials, Liquid Foam, Rubber, Aluminum, Ivory, Glass. Formulas, Manufacturing Methods, Mold Construction Included in Catalog. Send 25c. Gel, Box 261, Union, N.J.

PLEXIGLAS. Square foot cost, 1/16"—\$1.20; 1/8"—\$1.52; 3/16"—\$1.86; 1/4"—\$2.21; 3/8"—\$3.23; 1/2"—\$4.36. Colors add 10%. Send 15¢ for postage. Aristocrat Plastics, 23 Sussex Avenue, Newark, N. J.

EXTRA Money—Big profits operating your own plastic sealing business—Seal cards, photos, newspaper clippings, menus, portfolios, etc., up to 8" x 10" size. New one-minute sealing machine. Introductory offer \$29.95, includes supplies to get your money back. 10 day money back guarantee. Rush order now! \$10.00 Deposit on COD's. Plastic Machines, Box 2424, Norwalk, Calif.

POPULAR SCIENCE OPPORTUNITIES

41 CHEMISTRY & PHYSICS

ILLUSTRATED Catalog: Chemistry, mineralogy, biology 25c. Tracey Laboratories, Evanston, Illinois.

EXPERIMENTERS: Bargains Catalog, 25c (Refundable). Hagenow Laboratories, 2414 Clarks, Manitowoc, Wisconsin.

CHEMICALS and apparatus for industrial, analytical and private laboratories. Catalog 25c. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N.Y.

CHEMICALS in small quantities. Chemistry and Apparatus sets. 28th year. Catalog 25c. John H. Winn, 124P West 23 Street, New York 11, N.Y.

CHEMISTRY-Science magazines—Literature free. "Lankton." Box 5126-D15, Lansing 6, Mich.

CHEMICALS, Glassware Catalog, 25c. Laboratory Sales, Box 161-B, Brighton, Mass.

FREE Chemicals and chemistry literature Directory. National, 1148 Fifth, Redwood City, Calif.

42 HELP WANTED REPORTS

FOREIGN Jobs—Latin America, Alaska, Canada, up to \$1500 monthly. Up-to-date 1958 Foreign Service Directory gives complete information; hot list of firms hiring for Military and Civilian Construction, Aircraft, Oil, Exporters-Importers, Mining, How-When-Where to apply. 11th Successful year. \$1.00. Global Reports, Box 8873-P, Los Angeles 8, California.

COPYRIGHTED Reports on best paying jobs with travel, adventure, promotions. Construction, aviation, shipping, laborers, clerical, trades, supervisory, factory, unusual opportunities. Many types of work. Skilled and unskilled. Foreign and state side openings for men and women. Only \$2.00 (\$2.25 airmail), including registration-advisory service. Satisfaction guaranteed. Included absolutely free: Special reports on Alaska, Spanish airbase construction, South American opportunities and husband-wife foreign jobs. Research Services, Suite 514-PSX Meramec Building, St. Louis 5, Missouri.

AMERICAN Overseas Jobs. High Pay, Men, Women. Transportation Paid. Free Information. Transworld, Dept. IC, 200 West 34th St., New York 1.

YOUR Abilities needed in booming California industry! Act today! Send \$1.00 for your employment lists: Services, Box 561, Oakland, California.

HIGH Paying Jobs, Opportunities, foreign, USA. All trades. Companies pay fare. For information write Dept. 57L, National Employment Information, 1020 Broad, Newark, New Jersey.

WORK In Dynamic Detroit. Sunday classifieds airmailed \$1. Lloyd, Box 5035, Grosse Pointe 36, Mich.

SAN Francisco classifieds. \$1.00. Raymond Strohl, 640 Polk Street, San Francisco 2.

JOBS in California. All ages! Need hundreds of guards, unskilled laborers, mechanics, drivers, clerks, draftsmen, salesmen and many others. Name your job! \$300 to \$900 per month. Rush \$2.00. Satisfaction guaranteed or money refunded. Personnel Consultants, 2018D Channing Way, Berkeley, California.

JOBS in booming New Mexico. Write to Jobs, Box 1096, Albuquerque, New Mexico.

JOBS Overseas! Jancek Development Co., 109 Hub Station, New York 55, New York.

JOBS on Merchant ships. Big pay. Box 4092, Jacksonville, Fla.

FLORIDA'S Fabulous Features—Jobs, opportunities, fun, sun, easier living. Current information, \$2.00. Glo-Ern Creations, Rt. 5, Box 430, Tampa, Fla.

FLORIDA jobs pay big. Special copyrighted analysis airmailed \$2.00. Free contacts. Sun-Glo Service, Perry 14, Florida.

NORTH America's last great frontiers are under major development and expansion. Construction workers, truck drivers, business workers, tradesmen, oil workers, professionals, others, —for information write Opportunity News Service, SM, 1509, Kelowna, B.C., Canada.

43 AGENTS WANTED

YOUR own business—Suits \$1.50; Overcoats 65c; Mackinaws 35c; Shoes 12½c; Ladies' Coats 30c; Dresses 15c; Enormous profits. Catalog Free. Nathan Portnoy Associates, 2109-J Roosevelt Road, Chicago 8.

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Sign Letter Co., 1217-E West Newport, Chicago.

FREE Sample! Beautiful Feather Pictures. Sylvia, Apartado 9036, Mexico 1, D. F.

GOLD or Silver letters, numbers. Windows, Doors, Trucks 1" to 6". 500% Profits—Free Samples. Atlas-U, 544 West 79th, Chicago 20.

BUY 800,000 articles direct from manufacturers the world over at lowest prices. Make up to 1000% profit! Free Literature. Glass, Ellwood City 11, Pa.

GOLDMINE of 600 money-makers. Free copy. Specialty Salesman Magazine, Desk 6B, 307 North Michigan, Chicago 1, Ill.

CASH commissions at once, taking orders for magazines every family wants! No experience needed. For Free money-making kit, with everything you need, write McGregor Magazine Agency, Dept. 330, Mount Morris, Ill.

GET New Shirt Outfit Free: make \$90.00 weekly on 5 average orders a day. Famous quality Made-To-Measure dress and sport shirts at \$3.95 up sell fast to all men. No experience needed. Full or part time. Write: Packard Shirt Co., Dept. 645, Terre Haute, Indiana.

IF you're interested in making money in selling, see the hundreds of exceptional opportunities in Salesmen's Opportunity Magazine. Send name for your copy, absolutely free. Tell us what you're selling now. Opportunity, 848 N. Dearborn, Dept. 18, Chicago 10, Illinois.

IT'S easy to sell our big line business printing, calendars, advertising specialties and political advertising. Big cash commission each sale, even first day. Full or part time. Experience unnecessary. Prospects unlimited. Big sales kit free. National Press, Dept. 7, North Chicago, Illinois.

60% PROFIT On Cosmetics—Famous nationally advertised Hollywood Cosmetics pay 60%! Make \$25-day up! Hire others. For free samples, details, write Studio Girl, Glendale, California, Dept. 1184G.

WHOLESALE Clothing Catalog Plus Real Merchandise Samples. Bostonian, 14-D Dock Square, Boston 8, Mass.

BUSINESS of your own. Earning potential as high as \$40,000 annually. Issued on \$12,500 base. No merchandise to buy. Send for free explanatory booklet. Harrell & Company, Box 8-DD, Louisville, Ill.

CALENDARS, Advertising Novelties, Matches. All styles, including Religious. Varnished 12 sheet. Girls. Hundreds of Advertising Novelties. Book Matches, etc. Fleming Calendar Co., Promotional Division, 6539 Cottage Grove, Chicago 37, Ill.

SEEKING New Products? Get my outfit 47 money-making specialties. Latest conveniences for home, car. Send no money. Just your name. Kristee 80, Akron, Ohio.

PROFITABLE New Household Inventions—Details. Edwards, 300 Broadway, Camden 3, N. J.

AMBITIOUS Man—A highly reputable National Organization and leader in its field, has opening for ambitious man of unquestionable character and refinement. Work in your own community. Age 25-60. College education pref. Must be ready to accept position immed. if selected. A guaranteed income with a definite plan for advancement. Group insurance and a retirement plan based on profit sharing. To arrange for a local interview write Mr. Ralph Byers, Dept. 2994, Box 3565, Chicago 54, Ill.

71,000 ADVERTISING Novelties. Catalogs. Twelve Samples—\$1.00 (Refundable). Adelpia Specialty, 904 S. 58th, Philadelphia 43.

EVERY man a prospect. Request free sales kit showing line of belt buckles, individualized with customer's name and emblems also cap badges for trucking, bus, taxi, police, firemen. Choice 3000 emblems. Hook-Fast, Box 1425PS, Providence, Rhode Island.

EASY handwork makes fast-selling articles. Sample free. Sunmade Company, Brockton 64, Massachusetts.

MAKE 100% Profit Every Time You Push A Button! Quickie Spray shines all shoes instantly without daubing, buffing, brushing. Be first! Rush refundable dollar for demonstrator, selling kit. Franchises available. James R. Barnett Co., Dept. PS-48, Wellesley Hills, 81, Mass.

\$1.00 PROFIT selling \$2.95 photo enlargement offer. Allen Studio, Reigler Bldg., Little Rock, Arkansas.

BIG Profits — Stamp Social Security Plates Key Protectors. Sample—50c. Catalog Free. General Products, 188-PS State, Albany 10, N. Y.

WORLD'S Tiniest Radio. Real Deal. Dealers Wanted. Radio, P. O. Box 20739, Los Angeles 6, California.

NEW Hold-Tite Car Trunk Holder really sells. Direct—Stores. Sample \$1.00. Ohio Co., North Madison 7, Ohio.

\$1000.00 A Month Distributing VX/6. Restores car's battery life. Wanted by millions. Proven terrific seller. Free kit. National Dynamics, Dept. CD-6, 220 E. 23 St., New York 10, N.Y.

TAKE over your area as a Service Distributor keeping retail stores supplied. Our nationally advertised 27-year old line gives you 66½% mark-up. Tremendously successful moneymaking plan. Write G. W. Harris, c/o Novo, 1166 Milwaukee, Chicago 22, Illinois.

44 HIGH-GRADE SALESMEN

MAKE Extra Money. Cash commissions. Everybody buys easy-to-sell Advertising Book Matches. Union Label. Big variety—Glamour Girls, Scenics, Hillbillies. Powerhouse selling kit. Free. Steady repeat-business. No experience necessary. Superior Match Company, Dept. P-458, 7528 S. Greenwood, Chicago 19.

FAST Moneymaker—New Development—Uniforms advertise 24 hours a day. Exclusive with Master. Name—emblem glow in dark. Free outfit. Master, Dept. F-25, Water, Ligonier, Indiana.

CALLING on Businessmen? Low-priced printed envelope line can pay you \$67.50 extra profit weekly without extra calls! Free Sample Outfit. M. P. Brown, Inc., 424 N. Third, Burlington 32, Iowa.

AD Matches! Sell amazing designs—10, 20, 30, 40, and 240-light book matches. Bigger spot cash commissions; every business a prospect. Low prices for high quality. Repeats. Start without experience; men, women; full, part-time. Buy nothing. Sales kit furnished. Match Corp., Dept. PS-95, Chicago 32, Illinois.

AGGRESSIVE Salesmen. Big Commissions. Automatic needle threader sells fast. Savemore, 216-B W. Jackson, Chicago.

4 SLICE Deluxe toaster and little mother stove and sink. Send for Free catalog. S. Harris, Box 1435, Detroit 31, Mich.

ABUNDAVITA Means Better Living. Bigger Bank Balances! Campo, 391B Grand, Long Beach 14, California.

BUSINESS kit free! Postcard puts you in business! Complete line 230 shoe styles, also jackets! New discoveries pay big commissions. No investment. Send for free kit. Mason, Chippewa Falls 74, Wisconsin.

45 EDUCATIONAL & INSTRUCTION

COMPLETE Your High School at home in spare time with 61-year-old school. Texts furnished. No classes. Diploma. Information booklet free. American School, Dept. X446, Drexel at 58th, Chicago 37, Illinois.

USED Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

BE a Real Estate Broker. Study at Home. Write for Free book today. GI approved. Weaver School of Real Estate, 2018R Grand, Kansas City, Mo.

EARN While You Learn Auto and Diesel Mechanics. Master this top paying trade. Many graduates earn \$100 a week and up. Approved for Korean veterans. For free information write Dept. No. 262, Nashville Auto-Diesel College, Nashville 3, Tenn.

POPULAR SCIENCE OPPORTUNITIES

STUDY For Doctor's degree of Psychology, Metaphysics and Divinity. Correspondence courses only. College of Divine Metaphysics, Dept. P-S, 2811 North Illinois, Indianapolis 8, Ind.

HIGH School diploma at home. Licensed teachers. Approved materials. Southern States Academy, Box 5344-PX, Station E, Atlanta, Georgia.

WANT a Diesel Job? New Opportunities to increase income. Higher Pay. More Money. We can help you Qualify. Tools Shop method home training. Write today! Diesel, Tractor, Heavy Equipment Division. Interstate Training Service, Dept. B-2, Portland 13, Oregon.

ENGINEERING Degrees earned through Home Study. Pacific International University, (operating as a College of Engineering only at present) 5719-A Santa Monica Boulevard, Hollywood 38, California.

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" Bookkeeping and Tax Service. Full or spare time. Details Free. No obligation. Ellis, Box 203, Cedar Grove, North Carolina.

WELDERS earn big money. Easy to learn Arc-Gas-Automatic Welding. New equipment, low cost training in non-profit school GI Approved. Free Booklet. Hobart Welding School, Box P481, Troy, Ohio.

FINISH High School at home, spare time. No classes. Diploma awarded. Write for Free catalog. Wayne School, Catalog HBA-77, 2527 Sheffield, Chicago 14.

PIANO Tuning pays. Big money in spare time. Learn at home in 30 days. No musical knowledge necessary. Phonograph, records, tools and instructions furnished. Personal instructions available. Free catalog. Capital Tuning School, 3160 S.W. 16th Court, Fort Lauderdale, Florida.

A Dynamic Singing and Speaking Voice can be yours! Self-Training records. Thrilling details! Canfield, 2018-C Fifth Avenue South, Minneapolis 4, Minnesota.

MASTER Watchmaking at home. Free sample lesson. Chicago School, 2328-WD Milwaukee, Chicago 47.

LEARN Real Estate—Study at home. Send for free catalogue. Midwest School of Real Estate, 68 North Chicago Street, Joliet, Illinois.

WATCHMAKING—Jewelry Home Study Courses. Greatest Deal! Watchmaking Institute, Culver City, California.

MEN wanted age 19 to 45 to train as Builders, Estimators & Contractors at home in spare time. Big pay opportunities. Write for Free brochure. American Technical Society, 850 E. 58th St., Dept. PS-584, Chicago 37, Illinois.

ATTENTION Earth People... 1st edition hi-fi e.p. recording! "Trip to the Moon." Full narration and sound effects. Orbit—Box 4432, Miami Beach 41, Florida.

LEARN Arc, Gas, Hellarc Welding spare time at home. Big pay trade. Easy practical training covers Metallurgy, latest techniques, short cuts, metal repairs, etc. Free booklet. Write Utilities Engineering Institute, Dept. WM-9, 2523 Sheffield, Chicago 14.

FIND, organize, and direct your abilities for success via new, effective Straight-Line Method, with Creative Personal Collaboration. D. Wing, Croton Road, Newaygo, Michigan.

WE Pay \$3.50 lb. dried. Grow Mushrooms. Cellar, shed and outdoors. Spare, full time, year round. We have 25,000 customers. Free Book. Washington Mushroom Ind., Dept. 180, 2954 Admiral Way, Seattle, Wash.

MATHEMATICS, Spelling, Word Power. If weak in any of these vital subjects, we have what is needed to help you. Investigate. Home Study Educational Books, 530 Perry Street, Davenport, Iowa.

EARN College Degrees. Correspondence. Metropolitan University, Box 86, Glendale, California.

FREE Review: Self-Improvement, Educational Books. Rainone Publishers, Middle Village 79, New York.

EARN Degree. Free bulletin. Homestudy only. Midwestern Bible School, 1060 Broadripple, Indianapolis.

LEARN! Transfer Photo Prints on Textiles. Sample, Instruction \$4.95. Kasak, 53 Chicora, Toronto 5, Canada.

LEARN Mineralogy and Lapidary Art at home. Diploma Course. Earn Big Profits Making Costume Jewelry. Free Catalogue. Mineral Science Institute, Desk 3, 159 East Ontario, Chicago 11.

HANDWRITING Analysts now accepted in college, business, industry. Our men, women who use grapho analysis spare, full time earning more money, getting prestige, success, happiness. Uncrowded, fascinating field for intelligent men, women anxious to get ahead. We need more members. Investigate this growing field where you give a real service to your fellow man. Opportunities unlimited. Free sample lesson and information to all over 21. Write today! IGAS, 2307 National Station, Dept. 1012, Springfield, Missouri.

ELECTRICIANS—Learn The Code. Simplified low cost courses explain national code rules in plain language. Send for pamphlet. Garland School of Electricity, 828 Louisiana St., Sturgeon Bay, Wis.

HOW to write short stories, mysteries, articles. Learn at home for career or extra part-time income. Earn while learning. H. F. Wenderoth sold first story for \$240. Professional writers show you how. Send today for free lesson and book. Palmer Institute of Authorship, Desk UM-48, 1680 N. Sycamore, Hollywood 28, Calif.

SIMPLIFIED analytics teach algebra clearly—\$2; guaranteed. I-6123 Orchard, Dearborn, Michigan.

DRAFTING—Design: Architectural, Mechanical, Electrical, Structural, Aircraft, Surveying, Mathematics—Physics. Veteran approved. Mondell Institute, 230 West 41st, NYC.

PHYSICAL Therapy and Massage. Home Training. Practice privately or work with doctors and hospitals. Free Catalogue. National Institute, Box 4, 159 E. Ontario, Chicago, Illinois.

EARN Degree through correspondence courses or tests. Colleges abroad. Aurep, Central Valley, New York.

LEARN Piano Tuning Easily At Home. Our Graduates lead field. Our 60th year. Free Booklet. Niles Bryant School, Dept. S, 3711 Stockton Blvd., Sacramento 20, California.

SUCCESS impossible if you make any of these 33 errors. "Actual Case Studies" reveals & solves your secret career problems. Succeed! Earn more! Send \$1.00. Also "New Job-Winning Resume Guide" \$1.00. Flaghouse Publishers, New York 29, N.Y.

\$150 WEEKLY earned by Advertising Copywriters. Positions plentiful. Home Study Course guaranteed. Weekly payments. Ad-Writers Guild, Chester Springs 4, Pennsylvania.

46 CONTESTS

WIN contest money. General Contest Bulletin gives hundreds of tips. Lists current contests, rules. Sample magazine 25c. General Contests, 1609-A East 5th, Duluth, Minnesota.

47 DETECTIVES

LEARN Civil and criminal investigation at home. Earn steady good pay. Institute Applied Science, 1920 Sunnyside, Dept. 334, Chicago 40, Ill.

DETECTIVES—Work home—Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 86th, New York 24.

DETECTIVE Training. Phillips Secret Service System, 1917-C North Kenneth, Chicago 39, Ill.

BE A Detective. Write for free details. State Age. National Detective Academy, Dept. A, P. O. Box 1082, Scottsdale, Arizona.

50 BUSINESS SERVICE, INFORMATION, NAME LISTS

BIRTH Records, any State, \$5.00. C. B. Earl, Notary Public, Box 31, Lake City Hwy., White House, Fla.

WOMEN Mail Buyers 1000—\$2.00. Other Lists. Northwest, Medina, Washington.

51 SPECIAL SERVICES

EXPLORE and improve your thinking ability by amazing novel never-published scientific puzzles. Ask for three samples free! Prizes, rewards! Brain-Gym-Service, Box 322, Barberton, Ohio.

YOUR Personality analyzed from photographs. Write 10729 Francis Place, Los Angeles 34.

52 AUTHORS SERVICE

WANT Your Book Published? Learn how we publish, advertise, promote, distribute. Many successes. Free booklet PS. Vantage, 120 West 31, New York.

WRITERS: Book Manuscripts invited for publication on our cooperative plan. Greenwich Book Publishers, (Attn. Mr. Ibsen), 489 Fifth Avenue, New York 17, New York.

WRITERS! Become published authors. Free illustrated brochure reveals secrets of subsidy publishing, publicity, sales, for fiction, non-fiction authors. Address Paul Scott, Exposition Press, 386 Fourth Avenue, New York 16, N.Y.

53 ADVERTISING, AGENCIES, ETC., FOR ADVERTISERS

FREE expert assistance for mailorder advertisers. Ratebook leading newspapers, magazines, 10c. Chicago Advertising Agency, Chicago 4.

ADVERTISE: 24 words, 100 Canadian Newspapers, \$5.50. Lists Free. Advertising Bureau, 10511-P Springfield, Chicago 43.

FREE ad-guide. 20 Words—21 Florida Sunday Newspapers—\$6.00. Driscoll's, 1618-P4 Tinsman, Pennsauken 8, New Jersey.

54 CARTOONING, SIGN PAINTING, CHALK TALKS

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free, no obligation. Simply address: Cartoonists' Exchange, Dept. 194, Pleasant Hill, Ohio.

CARTOONISTS' Magazine. Lessons. Markets. Free Sample. Cartoonists, 2776 California Court, Lincoln 10, Nebraska.

YOU can Entertain with Chalk Talks. Catalog 10c. Cartoonist Balda, Oshkosh, Wisconsin.

PAINT Signs—Master die cut, outline letter patterns. Complete assortment. 1½" to 12" high, prepaid \$2.00. Eyerly, P-583, Newton, Iowa.

55 TYPEWRITERS & OFFICE MACHINES

TYPEWRITER. Adding Machine Bargains! Free List. Woods Typewriters, Bedford, Pennsylvania.

56 RUBBER STAMPS & OFFICE SUPPLIES

THREE Lines \$1.00. Rubber Stamp Service, 109 North Hyatt Street, Tipp City, Ohio.

THREE Line Metal or Plastic Pocket Case. \$1.00. Hand Stamps To 3" x 5". Mated Mailers, P.O. Box 494-2, Buffalo 5, N.Y.

GOOD impressions pay... 3 lines \$1.00. Boardman, P. Houghton, New York.

THREE Line Name & Address, In Self Inking Pocket Case. \$1.00. M. A. Sanders, Rte. 2, Box 7-C, Manteca, Calif.

RUBBER Stamps galore! Stock from 35c, personal 3 line pocket stamp \$1.00—stamp supplies, Sam Lynne, 6635 S.W. 45th St., Miami, 55, Florida.

INDEXED Cushioned 3 Lines \$1.00, 4 Or 5 Lines \$1.50. (Script or Print) Free Stock Stamp Circular. 1 Day Service. Youngers Stamp Shop, Princeton, Iowa.

INDEXED or Pocket Stamp, 3 Lines \$1.00. Quality Stamps, 114 Hollywood, Biloxi, Miss.

57 PRINTING, MULTIGRAPHING, ETC.

OFFSET Booklet Printing, 5 M, 8 page bkit, 5½x8½ bound \$73.00. 5 M, 8 page bkit, 8½x11 bound \$120.00. 5 M 12 page bkit 7½x8½ bound \$135.00. Copen Press, 105 Court St., Brooklyn, New York.

1,000 BUSINESS Cards. "Raised Letters" \$3.50. Samples. Pioneer, Island Park #10, New York.

SMART Effective Printing. Moderately Priced. Free Literature. Holmes, 35 Bowdoin, No. Quincy 71, Mass.

1000 LETTERHEADS \$7.95—6¾ Envelopes \$5.95. Other Bargains! Decco, Box 3315-S, St. Louis 3.

POPULAR SCIENCE OPPORTUNITIES

100 6-3/4 ENVELOPES. 100 5 1/2 x 8 1/2 Letterheads \$3.85. Fred, The Printer, Box 623, Dept. S, Independence, Mo.

CIRCULARS 1000 3x6 \$2.25. 1000 6x9 \$6.00. Price List. Valaitis, 1705 South 2nd, Phila. 10, Pa.

PERSONAL Stationery. 100 letterheads. 100 envelopes, \$2.00. Cardinal Printing, 813 E. Pacific, Appleton, Wis.

OFFSET Printing—24 hour service—\$6.75 1000. 8 1/2 x 11. National Letters, 251 West 42 St. New York 36, New York.

BUSINESS, Personal Printing—Labels, Rubber Stamps, Accessories. Illustrated Catalog, Free! Brose, 196-B, Clerk, Jersey City 5, N. J.

500 3/4 x 2 1/4 FOUR line gummed stickers 50c. Red Border \$1.00. Moritz Printer, Saginaw, Michigan.

SAVE . . . 1000 Business Cards \$3.00. Skilprinters, 518 Madison, Marianna, Fla.

FREE Catalog. Postpaid Printing. D M Press. Sebastopol, California.

100—6 3/4 ENVELOPES. 100—5 1/2 x 8 1/2 Letterheads printed any color, \$2.00. M. Fortney, R3, Dillsburg, Pa.

OFFICE forms. Illustrated salesletters, circulars, prepared, offsetted. Reasonable. Worldwide, Los Alamitos 2, Calif.

58 PRINTING OUTFITS, SUPPLIES

DO your own printing. Save money. Simple rules. We supply everything. Print for others; good profit. Raised printing like engraving too. Have home shop. Details free. Kelsey Presses, V-8, Meriden, Conn.

RUBBER Stamp making presses, hydraulic operated, electrically heated. Sizes 5"x8", 8"x12", 10"x15" starting outfits. All kinds supplies. Custom Manufacturing, 601 N. Jefferson, Springfield 2, Missouri.

PRINTING Presses, Type Supplies. Lists 3c. Turnbaugh Service, Mechanicsburg, Pa.

MIMEO & Duplicating Paper; wholesale prices; samples. Brookman Paper Corp., 555 Westchester Ave., N. Y. 55. MO. 5-0146.

MAKE Your Own self-molding rubber stamps and printing cuts. Plexirubber, Argyle 2, Wisconsin.

TYPE cases, cabinets, from manufacturer. Free catalog. King McKay Company, 23179 Telegraph Road, Detroit 41, Michigan.

59 PATENT ATTORNEYS

C. A. Snow & Co.—S-427, Snow Building, Washington 1, D. C. Registered Patent Attorneys. Write for information.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent. John Randolph, Registered Patent Attorney, 807 Victor Bldg., Washington 1, D. C.

INVENTION Record form free and "Patent Information Every Inventor Should Have." Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

INVENTORS—If you believe you have an invention, you should find out how to protect it. The firm of McMorow, Berman & Davidson, with offices in Washington, D.C., is qualified to take the necessary steps for you. Send for copy of our Patent Booklet "How to Protect Your Invention." We will also send you an "Invention Record" form. No obligation. They are yours for the asking. McMorow, Berman & Davidson, Registered Patent Attorneys, 143-E Victor Building, Washington 1, D.C.

INVENTORS—If you have a valuable invention, you are advised to authorize a preliminary search through appropriate classes of United States patents. This firm is registered to practice before the Patent Office and is available to make such search and report to you concerning the probable patentability of your invention. Instructive booklet with "Evidence of Invention" form sent upon request. Victor J. Evans & Co., 441-D Merlin Building, Washington 6, D.C.

"INVENTOR'S Guide" and "Record of Invention" free on request. Frank B. Ledermann, 154 Nassau Street, New York City.

INVENTORS: Learn how you can protect your invention. A specially prepared booklet "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be promptly forwarded to you upon request—without obligation. We are registered to practice before the United States Patent Office and are prepared to serve you in the handling of your patent matters. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 82B-D District National Building, Washington, D.C.

60 FOR INVENTORS

INVENTORS—Send for free Patent Information book and Inventor's Record. Registered Patent Attorney, Associate Examiner, Patent Office 1922-1929; Patent Attorney & Advisor, Navy Department 1930-1947. Gustave Miller, 48PSI Warner Building, Washington 4, D. C.

INVENTORS, if you have an invention for sale, patented or unpatented, write Institute of American Inventors, Dept. 30A, 635-F St., N.W., Washington 4, D. C.

INVENTION Record form free and "Patent Information Every Inventor Should Have." Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John Randolph, Registered Patent Attorney, 806 Victor Bldg., Washington 1, D. C.

INVENTORS Don't sell your invention Patented or Unpatented until you receive our offer, write Cowgill, Box 298, Marion, Ohio.

INVENTORS—If you believe you have an invention, you should find out how to protect it. The firm of McMorow, Berman & Davidson with offices in Washington, D.C., is qualified to take the necessary steps for you. Send for copy of our Patent Booklet "How to Protect Your Invention." We will also send you an "Invention Record" form. No obligation. They are yours for the asking. McMorow, Berman & Davidson, Registered Patent Attorneys, 143-D Victor Building, Washington 1, D.C.

INVENTIONS protected without Patents. Tekservice, 282 Woodcliff Station, North Bergen, N.J.

INVENTORS—If you consider your invention to be something of importance, take steps to protect it with a United States Patent which gives you the right to exclude others from making, using and selling your invention as claimed. "Patent Protection for Inventors" outlines steps to take to secure patent protection. Mailed promptly without obligation. Victor J. Evans & Co., Merlin M. Evans, Registered Patent Attorney, 442-D Merlin Building, Washington 6, D.C.

INVENTORS: Learn how you can protect your invention. A specially prepared booklet "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be promptly forwarded to you upon request—without obligation. We are registered to practice before the United States Patent Office and are prepared to serve you in the handling of your patent matters. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 82A-D District National Building, Washington, D.C.

INVENTORS! Have you good patentable ideas? Write Mr. Metzler, 11 West 42nd, New York.

LET Us Make Patent Drawings for You or Your Attorney. 35 Years Experience. Patent Service Associates, Haverhill, New Hampshire.

INVENTIONS wanted now by my Manufacturer—Clients. Patented. Unpatented. Write Gilbert Adams, Patent Broker, 80-B Wall Street, Financial District, New York City.

ENGINEERING, patent searches, drawings. Invention forms. Todd, Consulting Engineer, 54 West 106th, New York 25.

"INVENTOR'S Guide" and "Record of Invention" Free on Request. Frank B. Ledermann, 154 Nassau Street, New York City.

DEVELOP, protect, market, unpatented inventions. Any question answered. Detailed information 25c. Standifer, 2645 Bartlett, Oakland 2, Calif.

PATENT Searches \$5.00. 48-hour airmail service. Invention Protection forms free. Write Patent Engineering Service, 711 14th Street N.W., Washington 5, D.C.

PATENT Searches including copies of nearest patents, \$6.00. Reports airmailed within 48 hours. More than 100 registered patent attorneys use my service. For Free invention protection forms, write Miss Ann Hastings, P.O. Box 176, Washington 4, D. C.

PATENT Searches \$5.00. 48-hour service. Free Invention Protection forms. Write Raymond L. Smith, Patent Searcher, 620 Sheraton Building, Washington 5, D. C.

61 INVENTIONS WANTED

INVENTIONS wanted. Patented; unpatented. Tremendous Manufacturers lists. Global Marketing Service, 2420 77th, Oakland 5, Calif.

INVENTORS Don't sell your invention Patented or Unpatented until you receive our offer, write Cowgill, Box 298, Marion, Ohio.

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information free. Institute of American Inventors, Dept. 30C, 635-F Street, N. W., Washington 4, D. C.

IF your invention is adaptable to promoting we will contract for selling on cash or royalty. Free booklet outlines royalty rates, requirements. Kessler Corporation, 741W, Fremont, Ohio.

INVENTIONS Wanted: "Patented"—"Patent Pending". 27 years experience Promoting Inventions. National Service Bureau, 3122 Meramec, St. Louis 18, Mo.

SUPERIOR promotions. Patented, unpatented inventions. Informative booklet, free. Superior, 338-342 North Rodeo, Beverly Hills, California.

INVENTIONS wanted now by my Manufacturer—Clients. Patented. Unpatented. Write Gilbert Adams, Patent Broker, 80-B Wall Street, Financial District, New York City.

62 PATENTS FOR SALE

VEHICLE suspension patents and elongated brake and traction track device. Alex Moorehead, North San Juan, Nevada County, California.

63 MANUFACTURING

AUTOMATIC Paint Manufacturing equipment. Finest formulas and training free. 4106 Central Avenue, Hot Springs, Ark.

64 MODELS, MODEL SUPPLIES

LIONEL Trains. Big Discounts. Bulletin Free. Catalog, 25c. Mack Brothers, 2041 Chicago Ave., Chicago 22.

SHIP and yacht model fittings; blueprints. Send 35c for illustrated catalog =29 listing hundreds of items. A. J. Fisher, 1002-2 Etowah Ave., Royal Oak, Michigan.

SHIP Models. Most complete line in New England. Kits, fittings, plans, books, tools, engines, motors. 1958 illustrated catalog 35c. James Bliss and Co., Inc., Dept. PS, 342 Atlantic Avenue, Boston 10, Massachusetts.

MODEL Railroadings is fun. Learn all about it. Send 25c now for sample magazine and descriptive instruction booklet. Model railroader Magazine, Dept. 340PS, Milwaukee 3, Wisconsin.

IMPORTED German Toy Helicopter. Flies up to 60 Ft. \$3.98 postpaid. Halaby, 1613 Cedar, Cincinnati 24, Ohio.

ROCKET Plans: #1: \$2.00, altitude 1.5 miles; #2: \$1.00, altitude 1,000 feet. William Struve, Carleton College, Northfield, Minn.

POWER Models. Unusual steam, gasoline and traction engines, fittings, metals. 32 books on Model Engineering. New comprehensive catalog \$1.00. Charles Cole, Ventura, California.

"ST" Steam Engine Castings, Fittings Catalog 15c. Ship Models Ltd., 186 Summer, Andover, Mass.

MINIATURE Engines: Gasoline and Steam. Build Them on Your 6" or 9" Lathe. Illustrated Catalog. Listing Castings, Blueprints, Fittings, etc., Only 10c. Octura Models, P.O. Box 536-PS, Park Ridge, Illinois.

POPULAR SCIENCE OPPORTUNITIES

ROCKETS—Build Your Own Working Models. 1 and 2 stage. Full Details on Construction, Fuel, Launching Platform, Electrical Firing System, etc. \$1.00. Dept. D, 1311 Rosewood Drive, Columbia, S.C.

HO Railroaders: Don't miss out! Send name for free Bargain Bulletins. Giant catalog 50c—refundable. Southern Tier Hobby, 32 Davenport, Hornell, N.Y.

65 HOME CRAFTSMAN

WOODWORKING and Cabinetmaking course for beginning and advanced home craftsmen. Only complete low-cost home training program available. Write for free booklet. Interstate Training Service, Dept. G-2, Portland 13, Oregon.

FREE "Do-It-Yourself" Leathercraft Catalog. Tandy Leather Company, Box 791 E25, Fort Worth, Texas.

LEARN Art Metalcraft and Jewelry making. Complete, inexpensive, home training course now available. Special tools and materials furnished. Write for free booklet. Interstate Training Service, Dept. L-2, Portland 13, Oregon.

FREE Catalog. 2150 Artist-drawn Patterns, Designs, Craftplans, 1323-B Wabash, Chicago 5.

AMERICA'S most complete Home Craft supply company. Send 10c for big colored catalog. Giles Kendall Company, Huntsville, Alabama.

FREE Leathercraft Catalog. Kirkpatrick Leather Co., Box 637-A4, Gainesville, Texas.

BUY your picture frame moldings at wholesale, less than cost of raw lumber. Complete assortments. Make money making picture frames. Free delivery in U.S.A. Write for price list. Chesapeake Framers, Box 533, Baltimore 3, Maryland.

MINIATURE flying rockets. Plans \$1.00. Information free. Henry Maras, 37 Prospect, Hamburg, N. Y.

SCOTCHLITE letters—mailbox, bumper, signs. Sample 15c. Specify initial. Nite-Site, Hilton, N. Y.

NEW patented lifetime tile cutter. Cuts asphalt, asbestos, vinyl, etc. Saves time. Eliminates breakage. Only \$3.95. Guaranty Sales Co., Box 55S, Grosse Ile, Michigan.

STYLECRAFT "Pretraced" leather kits. Handbags, Billfolds, Filigree Belts. Patterns on leather. Just carve, assemble and lace. "Pre-carved" kits also available. Send 25c for catalog, free folder. Refunded first order. Apache Leather Company, 2804 E. Washington St., Phoenix, Arizona.

100 JIGSAW Patterns. Assorted, plus alphabets. \$1. Barebo, O'Fallon 4PS, Missouri.

SQUAREKNOTTERS: Make belts, handbags, lanyards, dog leashes, etc. Special offer! Beginner's book, catalog and quality cord samples 25c. P. C. Herwig Co., Dept. 71-P7, 39 Henry St., Brooklyn 1, New York.

KNOCKDOWN cedar chest and lumber, free price list. Bedford Lumber Company, Shelbyville, Tennessee.

LEATHERCRAFT—Leather, Craft Supplies, Dies, Embossing Plates, Copper and Aluminum Tooling. Catalog 25c. Louis Jones—304 Main, Fort Worth, Texas.

66 DO IT YOURSELF

GRANDFATHER clock movements, barometers, blueprints, kits. Wholesale catalog 25c. Mason-Sullivan, Noroton 2, Connecticut.

NOW Available! Nationally known power lawn-edger, hedge-trimmer in kit form. Build your own with our parts, plans; save up to 70% of retail value. For details, write: Powur-Trim, Box 8626, Fort Worth, Tex.

CLOCK Enthusiasts: Simplified Plan and Instructions to Build Authentic Grandmother Clock 54 Inches Tall. \$1.00. A. J. Smetana, 1963 N.E. 172 St., North Miami Beach, Florida.

BOTHERED with hip pocket, pant leg fumbling? Make handy holster type hammer holder. Hammer always quickly drawn and replaced. Valuable time saver. Material with instructions \$1.00. Freeland's, 173 Crownhill, Amherst, Ohio.

INSULATE roof, stops loss of shingles, leaks, with amazing self-locking, do-it-yourself Shingle Clips. Used by U.S. Government. 50 plus pusher \$1.00; pamphlet. Blacow, Box 602, Livingston, N. J.

BUILD Rotary tiller and mower combined or separate. Ride or walk. Kits complete. Mass production low prices. 2½ and 3 h.p. engines \$35.00 and \$38.00. Literature free. Shaw Du-Ali (PS), Galesburg, Kansas.

MOWER Kits. Complete. Easy to Assemble. Write for Free Literature. Triangle (PS), 185, Fort Scott, Kansas.

POPULAR Indoor Louver Shutters. Install them yourself. Denton Industries, Box 3026, Meridian, Miss.

67 OLD GOLD, JEWELRY, WATCHES, ETC.

USED and new watches \$2 up. Free List. Southern Watches, 5-PS So. Wabash, Chicago 3.

COSTUME Jewelry Supplies. Settings, Rhinestone, etc. 88 page illustrated catalog. 25c. Milady, Box 1328 G.P.O., New York City (1).

HIGHEST Cash For Old Gold, Broken Jewelry, Gold Teeth, Watches, Diamonds, Silverware, Spectacles, Platinum, Mercury. Free Information. Rose Refiners, Heyworth Bldg., Chicago 2.

FREE Illustrated Catalog. Costume Jewelry Parts, Supplies. Folsom's, Box 52, Medford 55, Massachusetts.

GOLD, Silver, platinum, diamonds wanted. Cash immediately, highest prices; appraisals made. Wilmot's, 1067 Bridge, Grand Rapids 4, Michigan.

HIGHEST Cash Paid for old Gold, Jewelry, Watches, Diamonds, Silver, Gold Teeth, 100% Full Value Paid Immediately. Satisfaction Guaranteed. Mail Articles Today. Information free. Established 1900. Chicago Gold Smelting Co., 6 E. Monroe St., Dept. 357, Chicago 3, Ill.

10 SWISS Watches \$18.00. Catalog 25c. Berkowitz, 1150 Castlehill, New York 62.

DIAMONDS: Flawless, Full Cut, Registered, Mounted, Discounted. Write House of Marshall, Lyons 30, New York.

68 TOBACCO & PIPES

IMPORTED pipe lighter—Guaranteed fool-proof, efficient, \$1.00. Wilco International, 1335-B Lloyd Street, Milwaukee 5, Wis.

69 FOR THE HOME

FOAM rubber furniture cushions—Factory seconds 50% discount. Free catalog. Perma-Foam, 390-A Nye Ave., Irvington, New Jersey.

CESSPOOLS, septic tanks, outdoor toilets, cleaned, deodorized without digging, pumping or moving. Free details. Chemical Cesspool Cleaning Company, Boston 34, Massachusetts.

70 OF INTEREST TO WOMEN

MAKE \$25 to \$35 weekly addressing envelopes. Our instructions reveal how. Glenway, Box 6568, Cleveland 1, Ohio.

DRESSES 24c; Shoes 39c; Men's suits \$4.95; trousers \$1.20. Better used clothing. Free Catalog. Transworld, 164-T Christopher, Brooklyn 12, N. Y.

60% PROFIT On Cosmetics—Famous nationally advertised Hollywood Cosmetics pay 60%! Make \$25-day up! Hire others. For free samples, details, write Studio Girl, Glendale, California, Dept. 1184G.

WE Pay \$3.50 lb. dried. Grow Mushrooms. Cellar, shed and outdoors. Spare, full time, year round. We have 25,000 customers. Free Book. Washington Mushroom Ind., Dept. 181, 2954 Admiral Way, Seattle, Wash.

MONEY, Typing—Sewing! Details Free! Edwards, 3912-PS, 12th, Des Moines 13, Iowa.

\$1,000.00-\$5,000.00 YEARLY Possible. Addressing Envelopes, Postcards, for Advertisers! Further Information, Free. Mann, 427-C, Woodcliff Lake, N. J.

\$200.00 MONTHLY Possible. Sewing Babywear! No house selling! Send stamped, addressed envelope. "Cuties." Warsaw 14, Indiana.

71 FOR SALE MISCELLANEOUS

WALLETS, Pigskin Calf Morocco Imported Leathers. Box 504, Nyack, New York.

COMMERCIAL stainless sinks, tables, cabinets, etc. Bachrach, 1445 56th, Brooklyn 19.

GERMAN Black Forest clocks. \$1.45-\$1.98. Free details. Heins, Box 19B, Old Bridge, New Jersey.

72 WANTED TO BUY

QUICKSILVER, platinum, silver, gold. Ores analyzed. Mercury Terminal, Norwood, Massachusetts.

TOP prices paid for old copies of Popular Science—need only issues from period 1890 to 1915. If books are complete, even though condition is not perfect, please write us and describe what you have. Do not send the issue until you hear from us. Write to Box 308, Tuckahoe, New York.

CASH Guaranteed by return mail for Old Gold, Broken Jewelry, Rings, Gold Teeth, Platinum, etc. Mail Articles Now. Free Information. Eastern Refiners, 102 Pine Street, Bristol, Conn.

73 WEARING APPAREL

SKYSCRAPER-Heel Shoes! Photo Catalogue, \$1.00. Pinecraft, Box 442-Y, Hollywood 28, Calif.

75 TATTOOING SUPPLIES

LEARN profitable, fascinating Tattooing. Free illustrated information. Zels, 728-B Leslie, Rockford, Illinois.

77 GEIGER COUNTERS & TREASURE FINDERS

FIND lost or hidden treasure with new, improved metal detector. No ground pick-up. Also, underwater metal detector. Free literature. Gardiner Electronics, Dept. 1, 2545 E. Indian School Road, Phoenix, Arizona.

MONEY . . . In Hidden Treasure. Find It . . . With a Goldak Treasure Finder. Send For Free Literature on Complete Line of Mineral & Metal Locators, Underwater Detectors, Etc., Priced as Low as \$64.50. In Celebration of Its 25th Year, Goldak Co. Introduces New Transistor Instruments for Greater Sensitivity, Less Weight, Low Cost Flashlight Batteries. Write for Information Today! Goldak Co., 1540 W. Glenoaks Blvd., Glendale, Calif.

GOLD, silver, metal detectors, Geiger counters for uranium. Violites. Sensational new fully guaranteed models. None finer. Information free. Detecron Corp., 5528 Vineland Ave., North Hollywood, Calif.

FREE Literature—Lightweight, guaranteed Metal Detectors, Geiger Counters and Mineralights. Kits and Assembled Models. Electronic Applications, Dept. S, Box 8, Arlington 10, Virginia.

TRANSISTOR Treasure Finders, Geiger Counters. Latest Underwater Detector. Free Catalog. Sierra Scientific PS-20, 5415 York, Los Angeles 42, California.

TREASURE Locators. Newest treasure finder in 20 years. Guaranteed M-Scope. Transistorized. Proven Performance. Terms. Catalog. Fisher Research, Dept. C-2, Palo Alto, Calif.

78 WATCH REPAIRING

WATCH and clock repairing books. Free catalog. North American, 2320-BR, Milwaukee, Chicago 47, Illinois.

WATCHMAKERS' Tools, Materials, Supplies. Watches. Catalog. Gales, Box 1000, Chicago 90, Illinois.

79 MISCELLANEOUS

FREE Wholesale Catalogs! Sporting Equipment—Cameras—Homewares—Everything. Econ-O-Mart, Whippany 6, New Jersey.

WHOLESALE Price List Free! Save 50%! Appliances, Cameras, Sporting Goods, Housewares, Hardware, Jewelry, Clothing, Gifts, etc. Buy-Rite, Hawthorne 62, New Jersey.

BUY Wholesale! 25,000 Nationally Advertised Products. Get Amazing Dealer Catalogs. Complete Details Free. American Wholesalers, 1841-E Levee, Dallas 7, Texas.

WORLD'S Smallest Bible, 50c. Three, \$1.00. H. Boas, Route 5, Box 68, Darlington, S. C.

POPULAR SCIENCE OPPORTUNITIES

AMAZING New Plan Free! "How To Retire At Age 21." Men or Women Over 21 Can Retire Now. Shows how you can prepare for life of leisure if you're under 21. Bob Belmont, Box 258, Hawthorne 1, N. J.

CAN you find use for Amazing Kinetic Luminescence? Baffles us! Working model \$2. Fascinating! Glass Products, Sonoma, Calif.

FREE Literature — Make Big Money Raising Fishworms and Crickets. Carter Farm-12, Plains, Ga.

CUCKOO Clocks Save 50%. Free List. Virginia World Trade Co., Import Dept., Centreville, Virginia.

SNOW Cone Machines. All Prices And Sizes. Special For Grocery Stores. Box 7803, Dallas, Texas.

WE Pay \$3.50 lb. dried. Grow Mushrooms. Cellar, shed and outdoors. Spare, full time, year round. We have 25,000 customers. Free Book. Washington Mushroom Ind., Dept. 182, 2954 Admiral Way, Seattle, Wash.

RECEIVE—Magazine Samples, Mails, Catalogues, Offers From Everywhere. Get Listed 25c. Rorick's, Cincinnati 26, Ohio.

LUCKY Rabbit's Foot Key Chain With Your Initials. 50c. Carlen, Box 2, Morton Grove, Illinois.

BIG interesting malls three months 25c, year \$1.00. Harvey Teeple, Decatur, Indiana.

RING—Valve Job while driving. \$6.00. Literature. Motaloy, Grantham 27A, Pa.

RECEIVE Mails, magazine samples, offers, opportunities, get listed 25c. E. Polaski, Box 272, Miami 47, Florida.

CIGARETTES—Improved roller makes 20 for 9c. Facts free. Moberly, Box 811, Owensboro, Kentucky.

BEAUTIFUL Antique Wall Telephones. Free Bargain Circular. Tontz's, Elsinore, Calif.

79A WESTERN MERCHANDISE

FREE Catalog, Western Wear, Saddles, Boots, Leather Supplies. Silver Spur, Box 1785-B27, Fort Worth, Texas.

80 PERSONAL

"HOW Can I Find Out?" You Can! Information confidentially developed. Any matter, person, problem. World-wide. Officially licensed. Established 1922. William Herman, 15 Maiden Lane, New York 38.

MEXICAN Legal Matters. A. Espejo, Box 234-PS, Hermosillo, Sonora, Mexico.

PAY Your Bills Now. Borrow \$100.00 to \$600.00 Cash by mail. Easy, quick, private. Repay in small monthly installments over 20 months. Your payments may run 1/2 less than now; have money left over to spend. Loan Order Blank mailed Free in plain envelope. Advise amount needed. State Finance Co., 323 Securities Bldg., Dept. D-227, Omaha 2, Nebr.

VITAMINS—Save 45%. Buy Direct. All Formulas. Free Catalogue. Vitaspec, Box 4435-S, Philadelphia 40, Pa.

ENJOY Health. Free Booklet. Ruth's Nutrition, 152-Kearny, P.S., San Francisco, Calif.

BIBLE reveals Time of End! Exact Year, Month, Date sent free! Write: Harvest, Jefferson City 2, Missouri.

BLACK Forest Clocks—\$3.95, Binoculars German Imports—\$4.99. Robinson Co. (Imports), Joshua Tree, California.

POSTCARDS from 10 Countries. You Address, We Mail There—\$5. Letters 60c. Worldwide, 1335 Summit, Columbus, Ohio.

MARRIAGE, Divorce Requirements 48 States \$1.00. Pacific Enterprises, 4563 York, Los Angeles 41, Calif.

BORROW Money By Mail. \$100-\$600. Anywhere. Air Mail Service. Postal Finance, 200 Keeline Building, Dept. 657E, Omaha 2, Nebraska.

LETTERS remailed 25c. Jerry Love, 1419 E. 83rd, Los Angeles 1, Calif.

IMPROVE your health. Read Prevention, America's biggest and best health magazine. Introductory offer—5 months (over 500 pages) for only \$1.00. 10 months for \$2.00 (save \$1.50). Prevention, Dept. PS-1, Emmaus, Pa.

LAS Vegas, Nevada. Confidential Remails 25c \$3.00 Month, Classifieds \$1.00. Unique, Box 1376.

SECRET Mail Forwarding. \$3 month. Hedgpath, Box 830, Alhambra 24, Calif.

"RULE others with thoughts." (Telepathy.) Details—stamp. Wisdom, 846-S6 Sunnyside, Chicago 40.

LOS Angeles Classifieds \$1.00—Remails 25c. Sunset Specialties, Box 601, Culver City, California.

REMAILS 25c anywhere bay area from San Jose to Sacramento. Classified \$1.00 each. Monthly and package rates. Willson's, P.O. Box #1055, Antioch, California.

CONFIDENTIAL New York Remails 25c, Classifieds \$2.00. Norman, Box 72, Brooklyn 23, New York.

MEXICAN Law. Attorney Cenicerros, Apto. 79, C. Juárez, Chih., México.

SAVE Your Hair Through Proper Care! Instructions, \$1.00. Bedard, Box 637-B, Detroit 31.

ATTRACT Peace of Mind, Happiness and abundance through new interpretation of the Bible. Solves all problems. Write for Free Folder. Ontology, Homewood 146, Ill.

PERSONAL letter discussing your problems. Send \$1.00 to Box 7224, Orlando, Florida.

CONFIDENTIAL—remails 50c, Classifieds \$1.00. Box 568, Miami 42, Fla.

ADULTS—Receive "Interesting Mails." Send 25c. Bentz (Desk-S/71), Chatawa, Mississippi.

MAGIC Sex Indicator reveals innermost secrets. Free details. Dimensional Enterprises, Sedona 5, Arizona.

SAVE GAS

AND CUT FAN ROAR with

HYDRA-TORQUE FLUID FAN DRIVE

\$34.95 PREPAID

INCLUDING FAN AND ADAPTERS

NOTHING MORE TO BUY!

Pure silicone fluid drive automatically regulates fan speed to engine cooling requirements. Improves low-speed cooling, while conserving power and saving gas at normal driving speeds. NOT a fan release. Pure silicone fluid

drive never needs adjustment. Only type of fan drive approved by all Big Three car manufacturers for factory installation. Fits almost all V8's, 1954 through 1958. (Will not fit 1955-6-7 Chevrolet V8's) . . . In ordering, please indicate car make, year, and serial number, also engine serial number in case of Chrysler Corp. cars.

WRITE FOR BROCHURE. DEALER INQUIRIES INVITED.

O. W. DIETZ ENGINEERING CO.

P.O. Box 35, Harper Sta., Detroit 13, Mich.

Your Dollar Will Feed A Refugee

War and political refugees overseas urgently need the direct help, the personal encouragement, of CARE food packages—\$1 for 22 lbs. of farm staples, **Delivered In Your Name.** Mail your dollars to "Refugee Campaign," CARE . . . today!



660 First Ave.
New York, N. Y.

Printed as a public service

FREE Details
write today

MAIL ORDER Opportunity!

START FROM HOME...SPARE TIME

We want a limited number of intelligent men and women to work at home on an exclusive mail order business proposition. No selling—we furnish everything including literature, names, addresses, stock and ship items for you. All you do is mail for us and receive money coming to your own mail box. write: **MAIL ORDER DISTRIBUTORS (Franchise Division)**

15201 South Broadway

Dept. B-4

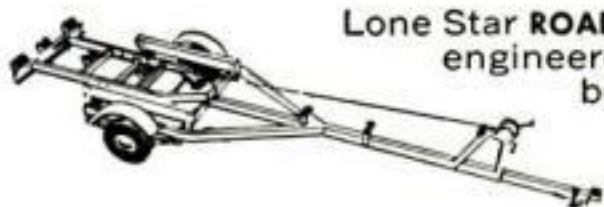
Los Angeles 61, Calif.



... now in the '58 Lone Stars!

Here's a sampling of Lone Star's terrific 1958 "Carefreedom" fleet. Dream cruiser . . . ski wizard . . . super-value fisherman. Designed for complete freedom from care! New performance, Styrofoam

safety, no maintenance, big value! At your Lone Star dealer's now! (Top to bottom) **CARIBBEAN**, 19' Fiberglass cruiser, 35-120 hp. range; **MALIBU**, 14' aluminum sport boat, 18-40 hp. range; **LITTLE FISHERMAN**, 12' aluminum cartop model, 3-7½ hp.



Lone Star **ROAD KING** Custom-engineered for all make boats 14' to 16'.



THE *Carefreedom* LINE

LONE STAR BOATS

For free folder, write:

1948-4 E. Main Street, Grand Prairie, Texas

Sold through Authorized Dealers served by plants in Grand Prairie, Texas; Bremen, Indiana; Tallahassee, Florida.



FREE 8MM or 16MM Home Movie FILM

Let me send you a delightful Exciting Film (Real Thriller!) and Special List of Films—all types—FREE! Simply enclose 25c for Shipping. State if 8 MM or 16MM desired. Mail today to: Guy's "Unique" Films, 2424 Entrance Drive, Dept. 5, Hollywood 27, California.

HUNT-MASTER RIFLESCOPES



\$9.95 INCL. MOUNT

- Your choice of power — 2½x, 4x, 6x
- 1 highest luminosity, color corrected
 - 2 cushioned lenses, fluoride coated
 - 3 positive adjustments, precise zeroing
 - 4 long eye relief (2½" - 4¼")
 - 5 easy installation
 - 6 rugged, durable, **DEPENDABLE**

Plus 35c postage and handling
10-day money back guarantee
Mounts to fit any make rifle, INCLUDING PELLET RIFLES. When ordering, specify type gun, model, brand. **TARGET BENCH-REST OR HUNTING**

All Types of Amateur **ASTRONOMICAL SUPPLIES:** Complete telescopes, mounts—mirror grinding supplies, misc. parts: write for **FREE CATALOGUE**. No C.O.D.'s please.



PENSCOPES \$9.95 (6 power)
A precision telescope that clips in your pocket like a fountain pen. For HUNTERS, SPORTS FANS, SIGHTSEERS, HOBBYISTS. NOW IN USE BY THE F. B. I.

COAST INSTRUMENT, INC. 4811 Long Beach Blvd. Long Beach, Calif



\$4.95 puts you in high profit MACHINELESS plastic business

**NO
SKILL
Required**

"SEAL IN PLASTIC"

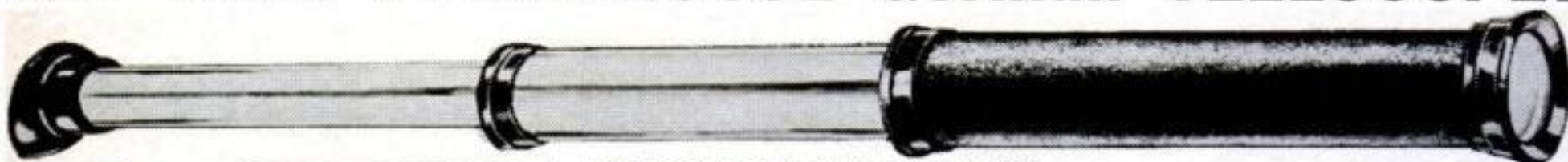
New secret formula makes you 1000% (\$4.95 becomes \$50.00) anyone in 30 seconds can make transparent plastic covering on both sides of **DRIVERS'S LICENSES, SOCIAL SECURITY CARDS, MEMBERSHIP and I.D. CARDS, COLOR PHOTOS, SNAPSHOTS, PASSES and DOCUMENTS.**

SELF-SEEL PLASTIC DOES ALL THE WORK Sales are complete on the spot — using our proven plan, without additional purchase you make \$2/min. and more. Work full-or part-time **AS YOUR OWN BOSS**—have security or unlimited part-time income. **EVERY PERSON OR BUSINESS A PROSPECT** — Everyone has from 2 to 8 cards, photos etc. that lamination with **SELF-SEEL PLASTIC** would

beautify—protect from wear, dirt, moisture, tearing—permanently. Businesses use 100's on I.D. cards, documents. Also, sell raw-material to photo, department, drug stores.

SELF-SEEL PLASTIC CO., Dept. R-7
6006 W. Pico, Los Angeles 35, Calif.
—100 SELF-SEEL SHEETS 3x4 wallet size..\$4.95
—100 SELF-SEEL SHEETS 9x12 size..... 39.95
sent postpaid; includes easy instructions and salesplans.
Also available in rolls 36" wide up to 2000 ft. long. Send sales plans.
Orders shipped same day rec'd. Enclosed is \$ _____
Name _____
Address _____
City & State _____

New 1958 POWERHOUSE German TELESCOPE!



FREE

**OUR \$4.98
GERMAN
BINOCULARS**

Famous Powerhouse '77' model. Thousands sold in U.S. & Canada for \$4.98—now yours FREE!

Keep FREE even if you return Telescope for refund. Offer limited. Order today!

New model best yet! Most low cost telescopes use 2 lenses—but this new Powerhouse uses 5—yes FIVE genuine synchronized Rothlar lenses—all ground and polished and ANCHORED in sturdy STEEL RINGS! Draw tubes are heavy-duty METAL. Contoured eyepiece for fast, easy focusing day or night. Now 225 times BIGGER AREA! What power! What range! What clarity! This new model is the crowning achievement of the renowned 102-year-old Rothlar plant in Bavarian Alps of Western Germany. Frankly, if produced here we would have to charge about \$10.00, but since we import by BOATLOADS and sell direct (no needless distribution costs or middlemen's profit tacked on) we are able to SLASH that price RIGHT IN HALF—way down to only \$4.98! Seeing is believing! You must be entirely sold on this new Telescope or your money back promptly—no questions asked! But you keep our famous Companion Powerhouse '77' German Binoculars FREE! That's our good will gift to you for just examining the telescope

**225
Times Bigger
Area!
5 Synchronized
Lens System!**

\$4⁹⁸

for 10 days. You can't lose in a deal like this. No wonder we've already distributed 50,000 Telescopes. 50,000 people can't be wrong! But this FREE-GIFT Offer will expire as soon as stock of binoculars is gone. Hurry! Next week may be too late. Rush \$4.98 check, cash or money order for prompt FREE delivery anywhere in the U.S.A. COD's plus COD fee and postage. Order direct from importer:

THORESEN, Inc., Dept. 7-D-40,
585 Water Street, New York 2, N. Y.

\$1,000,000 IN CONFEDERATE MONEY.



Be a deep-south millionaire with money to burn. You can do everything with this money except spend it. A million bucks in \$10's, \$20's, \$50's, etc. in

honest to goodness authentic reproductions of genuine Confederate money plus bonus bills. Light your cigarettes or cigars with a ten-spot. You get a million for \$2.98 or four million for \$10. Postpaid. Best Values Company, Dept. M-331, 403 Market Street, Newark, N. J.

Amazing 100-Year-Old Gypsy Bait Oil MAKES FISH BITE OR NO COST



PICTURES PROVE IT REALLY WORKS! Look at 1295 lbs. fish, those big hard to catch smell-feeders landed by Roy Martin party, Destin, Fla. Gypsy Fish Bait Oil used on all bait. Hundreds of pictures like these on file.

Mystery Scent Makes Smell Feeding Fish Go Crazy

Fishing scientists are just learning what wandering Gypsies knew 100 years ago... many kinds of the most wanted fish such as catfish, bullheads, carp, snappers, are "smell" feeders. Gypsies invented this amazing scented oil formula that excites these fish through the thousands of tiny smell organs covering their bodies. A whiff while feeding and these fish streak madly for your bait. They all fight over it and usually the largest fish wins. Just dab mystery scented Gypsy Fish Bait Oil on your bait... fish lakes, rivers, creeks, ponds, or the ocean... still fish with pole and bobber, cast, troll or spin... if yours isn't the biggest catch in the entire party, your money back. Say we're crazy. Be skeptical as you like. But let us send you the DOUBLE STRENGTH GYPSY FISH BAIT OIL to try at our risk.

Catch 300 Big Fish or Money Back

Send for the new DOUBLE STRENGTH GYPSY FISH BAIT OIL (double size) for \$1.98 or 3 for \$4.98. On arrival deposit your money plus C.O.D. postage thru postman. Cash orders sent prepaid. If you don't catch at least 300 smell feeding fish (big ones too) before all the Gypsy is used up return empty bottle for money back, FREE! Handy water-resistant fisherman's pouch for matches, lunch, tobacco, etc. included free to keep even if you return empty bottle. Accept this friendly challenge. Write today to

WALLING KEITH CHEMICALS, INC.
DEPT. 501-D BIRMINGHAM 1, ALABAMA

BOAT KITS 50 Models 8' to 18'

Big Catalog in Full Color



Runabouts, cruisers, convertibles, fishing: \$41.75 and up, Freight pd. Luger boats equal factory built; yet save you to 2/3 cost. Methods assure a perfect assembly by anyone. Send 25¢ today for big color catalog including: Fiberglass, paints, hardware, accessories.

LUGER INDUSTRIES, INC.
9200 Access Rd.

Dept. A-4
Minneapolis 20, Minn.



ANTIQUE WEAPONS

Fascinating illustrations, descriptions and histories of guns, swords, daggers, armor, etc., yours in our newest Catalog #30. 140 pages, crammed with unusual items, from choices for beginning collectors to rare museum pieces. Catalog #30—send your name and address with 50c to:

ROBERT ABELS, Box PS, 860 Lexington Ave., New York 21, N. Y.

When Writing to Advertisers Please Mention Popular Science

NEW, NATURAL LIGHTWEIGHT DENTAL PLATE



MADE FROM YOUR OLD ONE—New, Professional Method gives you natural-looking, perfect-fitting plastic plate—upper, lower or partial—from your old cracked or loose plate without an impression. CLINICAL method means fast service, huge savings. Try new plate full 30 days at our risk. New plates sent you Air Mail same day.

Now Priced
Low As
\$15⁹⁵

SEND NO MONEY—just your name and address for full particulars FREE. No cost. No obligation. Act now.

CLINICAL DENTAL LAB., 335 W. Madison St., Dept. X-1154, Chicago 6, Ill.

Kruger Pistol Bargain \$3⁰⁰

.12 CALIBER SINGLE SHOT

.14 MG. POWDER
CHARGE

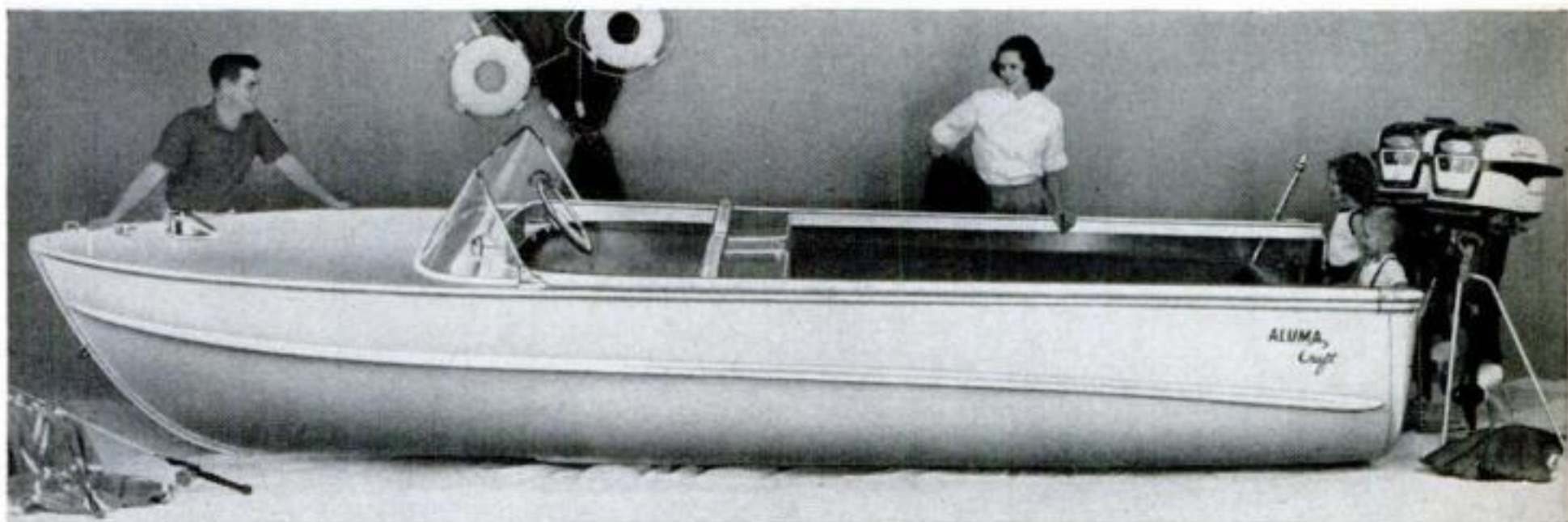
Crafted after famous German Luger design. Not an air or CO₂ gun. This is a small bore gun that actually shoots .12 caliber lead bullets fired by light 14 mg. powder charge. Beautiful gun, swell for target shooting. 4" steel barrel in knurled styrene stock. Overall length 8 1/2 inches. This amazingly low price is due to ball-and-cap design. Comes with 50 bullets, instructions, and target. Money back if not satisfied.

Send \$3 to **KRUGER CORP.,**
Kruger Building, Box 709-W, Alhambra, California



BLUE-
BLACK
FINISH

For a Royal Ride



THE **ALUMA** *Craft* Queen Merrie

Shipshape and seaworthy, the beautiful 18 foot Queen Merrie, 73" wide and 36" deep, gives you a royal ride. Ideal for family cruising, fishing or water skiing. Optional bunks under forward deck for overnights. Jump seats behind split-center deck for trolling are available. Roomy cockpit has floor decking. Plenty of dry locker space. OBC certified for 90 h.p. and very fast. Stable, steady and dry in rough water.

WRITE for catalog showing complete line of Aluma Craft from 12 ft. to 19 ft. in aluminum and glass and every price range.



ALUMA CRAFT BOAT COMPANY

1521 Central Avenue N.E., Minneapolis 13, Minnesota



TOP SPEED BETTER SKIING or FUN

MICHIGAN AQUA-JET propellers win twice as often in the "National Stock Outboard Championship" as all other wheels, custom-built included. Inexpensive stock propellers, requiring no alteration of lower unit, each specifically engineered for motor used (5 HP and larger). Send card for FREE 1958 catalog — the Outboarder's Bible. Shows how to get better performance from specific motor-boat-load combination for racing, skiing, cruising, pleasure — also fine line of boat fittings. Michigan Wheel Co., Dept. PS-4, Grand Rapids 3, Mich.

HULL AUTO COMPASS SILVER ANNIVERSARY MODEL

Case in gleaming, shiny silver finish. See it, along with regular 5-color selection, at your dealers.



For 25 Years,
America's Favorite
Motoring and
Boating Guides

\$5.50 to \$7.95

Write for
Literature

HULL MFG. CO. P.O. Box 246-E-4, Warren, Ohio



GET "ready to roll..."
with a

RANGER

ALL-WEATHER AUTO-TOP CARRIER

Carries luggage and equipment *safe and dry!* Over 14 cu. ft. capacity. Weighs less than 49 lbs. Aluminum over steel. Attaches with 8 big suction cups. Locks with key. Only \$59.50 fob factory, express collect.

STEMUN MANUFACTURING CO.
3919 W. National Rd., Springfield 20, Ohio

Bean's Free Catalog



Fully illustrated 108 pages, shows three hundred and seventy-five items of interest to both men and women—special fishing tackle, footwear, clothing, leather and canvas specialties, many of our own manufacture.

L. L. Bean, Inc., 254 Main St., Freeport, Maine
Mfrs. Fishing and Camping Specialties

LOOK WHO

is using the new

Johnson "citation"



Charley Anderson*, Chief of the Florida News Bureau, uses a Johnson Reel as he fishes the canals of his favorite state for baby tarpon.

VIP's, Very Important People from all walks of life, find lots in common when they select a spinning reel for light salt water and heavy fresh water fishing. These particular fishermen, some who can afford to pay a lot more* and some who have to carefully budget themselves*, all use the Johnson CITATION.

*To us, all are
Very Important People.



The Johnson CITATION comes loaded with 125 yards 10# test mono-filament line and has a 24' retrieve. Can be used on spinning or casting rod, right or left hand retrieve, and has all the other features of the famous Johnson Century Reel. Your favorite dealer will be glad to show it to you.

THE DENISON-JOHNSON CORP.

Mankato 65-B, Minnesota

BIGGER! BETTER! FINER! FASTER!

PENN YAN boats

... this year's line of leaders includes luxury outboard runabouts, Trailboats, Cartops® and canoes. Types for cruising, fishing, skiing, racing. New clinker models, superior in tightness, laps bonded by exclusive Vulcanile process. *Bond is stronger than the wood itself.*

**FREE
CATALOG:**
44 pages, color
illustrations.

Write Today!

PENN YAN BOATS, Inc.
35th St., Penn Yan, N.Y.



NEW! HMS BOUNTY MODEL KIT!

Famed mutiny ship. Every detail accurate—cannon, launch, rigging. Precision plastic parts, cement, plans. 14 3/8". \$2.98. For catalog, write Dept. SA, 4223 Glencoe, Venice, Cal.

wherever
hobby kits
are sold



\$2.98

250 POWER



**Complete
Telescope Lens Kit** only **\$3.49** postpaid

Conquer Space, Explore the Universe, Planets, Moon craters, New Stars, etc. Complete Lens Kit consists of 80 inch focal length ground and polished objective lens, eyepiece lenses for 50 POWER, 100 POWER, 150 POWER, 200 POWER, 250 POWER, and all necessary lens fittings. Easy to make from simple step by step instructions! (Tripod and mount not included.) Money back guarantee.

BUSSE SALES CO., Hartford, Conn., Dept. PS-66



**3 PASS.
SPORT CAR**
Ideal 2nd Car.
Fully Equipped

Write For Free Catalog.
Special Discount
to Dealers.

ESHELMAN TRACTORS

For Better Lawns
and Gardens, investigate
Eshelman Riding Rotary Mowers,
Tillers, Tractors. Ad-
vertised in Good
Housekeeping.

Thousands of
Satisfied Users.

Dept. 104, ESHELMAN,
Baltimore 2, Md.



LOW AS
\$99

24" cut \$275
36" cut \$399

Shipping Points: BALTIMORE •
CHICAGO • LOS ANGELES

DRIVE BY TACHOMETER!

Get Sports Car Snap, Economy!



For peak performance, with better gas, oil mileage and longer engine life, tune and drive your car by tachometer, like professional test and race drivers! Electro-Tach, compact, self-contained precision electric tach, gives top tuning and operating control at a glance, and "feel" of engine. Easy to install. 3 models. Top values. Send 10¢ for 8-pg. booklet "Installing and Using a Tach." Free literature.

DIXSON PRODUCTS CO., Dept. A-4, Vashon, Wash.



1958 PERKO NO.161 SMALL BOAT EQUIPMENT CATALOG

Check full of NEW and MODERN items.

78 Pages full of Equipment for Small Boats, Outboards, Runabouts, etc.

SEND FOR YOUR COPY TODAY
Include 25c to cover cost of
Mailing and Handling.

**PERKINS MARINE
LAMP & HARDWARE CORP.**
1946 PITKIN AVE., B'KLYN 7, N. Y.



Why champ* ART COOK says:

"The first practical repeating Pellgun Rifle I ever shot"

*Arthur E. Cook of Silver Springs, Md., member of national and international rifle teams, winner of three national championships and Olympic Rifle Championship, '48. Shown here is a recent group he shot with the Crosman "400" at 40'.



Crosman

"400" REPEATER

10 SHOT... .22 CALIBER

shooters have been looking for—championship accuracy, effortless repeater action, and economy. I know, because I'm using a Crosman '400' now. The ingenious Swing-Feed Loading repeater mechanism is simple and fool-proof, and a pleasure to use. All you do is slide the bolt; feeds and loads ten shots smooth as silk every time.

"And as for accuracy, you simply won't believe it till you've tried this gun yourself. The new Tru-Flyte barrel will shoot pellets all in one ragged hole. With the introduction of the '400' Repeater, Crosman has brought precision shooting into the pellet gun field."

Now being introduced by Crosman Select Dealers

Shooting is 3 Times MORE FUN with

Crosman

Crosman Arms Co., Inc., PS-16

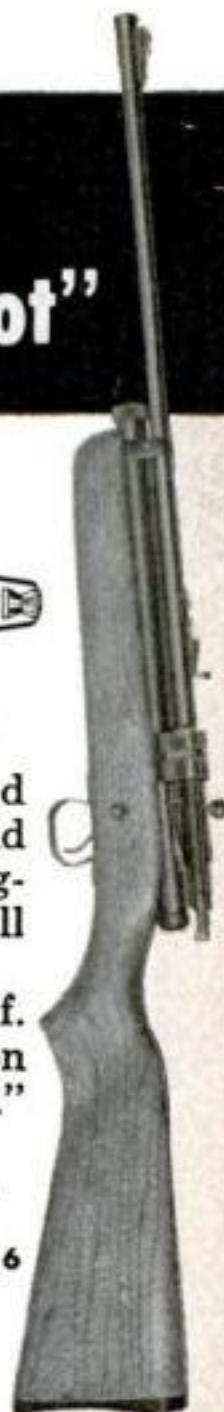
Available in Canada, Mexico and most other countries

Power
Without Powder®

PELLGUNS®

Fairport, N.Y.

World's Largest Manufacturer of Pellet Rifles and Pistols



FREE!



BRUSSELS EXHIBIT

We will send you one of the lovely U. S. President stamps from Grace Kelly's Monaco PLUS a Grace Kelly Wedding stamp FREE with your order for a First Day Cover of the new United States Commemorative stamp being issued April 18th to honor the great BRUSSELS EXHIBITION. Costs only 25c. Or order 5 all different U. S. and Canada First Day Covers for just \$1. Money back if not completely satisfied. Lists of other covers are free.

K. M. WALSH Box 308 TUCKAHOE, N. Y.

ARBO-GASTER GETS BIG BASS WAY DOWN DEEP



for BAIT CASTING
for SPINNING
for SPIN-CASTING

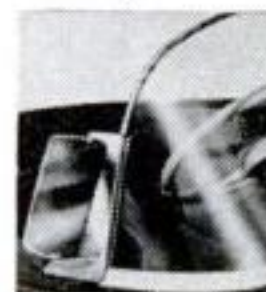
Amazingly weedless, rolls over deep-water snags. Perfect control, casting or trolling. Won't twist or turn over. 3 SIZES—1/8 oz.—1/4 oz.—5/8 oz.—\$1.35 ea. Choice of 6 flashy Reflector Finishes and 9 Standard Colors.

FRED ARBOGAST CO., INC.
2324 W. North Street, Akron 3, Ohio

FREE! WRITE FOR BIG COLOR CATALOG



Glamorize your boat with Taylor* MADE accessories



Be sure the windshield you buy is a Taylor-Made Holiday—then you can add the Top later.

HOLIDAY CONVERTIBLE — New VENTILATED BoaTop with "luxury-liner" look that's Taylor-Made for small boat budgets! Now available with new Holiday Windshield featuring "breeze-control" SpeedAire Wing Ventilators. Top: Aqua Grey Vivatex Duck or White Vinyl Nylon, in sizes for most boats. Taylor-Made... by the leader in Windshields and BoaTops.

Mail Coupon for Free 1958 Full Color Catalog

N. A. TAYLOR CO., INC., Gloversville 8, N. Y.

Please send free Catalog of Taylor-Made Products.

Name

Address

NEW - MIDGET SHORT WAVE RADIO



GETS STATIONS 12000 MILES AWAY!

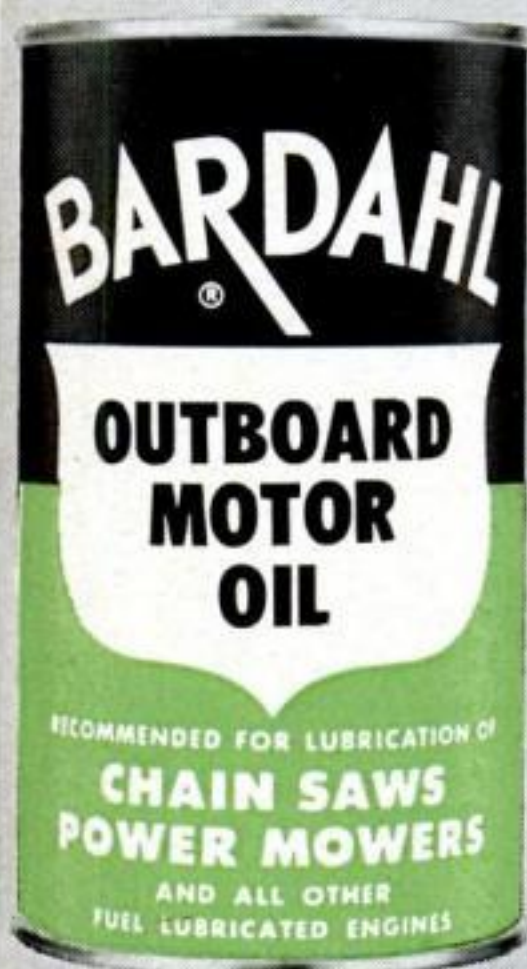
Tunes ALL foreign short wave bands. London, Paris, Moscow, Australia. ALL Amateur bands 160 to 10 meters! ALL long distance Air Force and Air Line aircraft, Ships at Sea, AF overseas broadcasts, State-County Police, Industrial bands—U.S. Radio broadcasts. Tunes 500 KC to 40 mc.—600 to 7 meters! NOTHING LIKE IT ON THE MARKET ANYWHERE AT ANY PRICE. Super-regenerative Receiver. Short antenna included—Hook up in 1 second! PORTABLE SELF-CONTAINED—POWERED WITH RADIO BATTERIES SOLD EVERYWHERE. NO AC PLUG-INS! Size only 4 1/2" x 6" x 4". Wt. complete—3 lbs. Calibrated hi-ratio easy tuning dial. Wonderful for Boy Scouts, tourists, vacations, amateurs, short wave listeners. EVERYONE CAN NOW HEAR THE WHOLE WORLD TALKING!

END ONLY \$4.00

(bill, ck, mo) and pay postman \$12.95 COD postage on arrival or send \$16.95 for postpaid delivery. Complete easy to wire kit includes all parts, tubes, broadcast coil, plastoid cabinet, instructions—(set of long life batteries \$2.99 extra). COMPLETELY WIRED AND TESTED—POSTPAID IN USA \$21.95. Easily a \$49.95 value. Order now before price goes up—GUARANTEED—AVAILABLE ONLY FROM:

WESTERN RADIO Dept. BRS-4 KEARNEY, NEBR.

CLEAN



OUTBOARD ENGINES stay clean longer with Bardahl Outboard Motor Oil. Get extra power at top throttle settings ... trouble-free operation at low trolling speeds. Also, excellent for power mowers, chain saws, and other fuel-lubricated motors.

BARD AHL: World's No. 1 Seller



— Available everywhere

Make with \$7 worth of materials . . .

SELL FOR \$125!

Every Home with Yard a "Hot" Prospect for

Colorful Cobbled
**CONCRETE
BARBECUE**

Get in on BIG PROFITS—up to \$20 an hour—by making these handsome sectional outdoor barbecues right in your back yard or garage . . . in 5 hours spare time! Cash in now on the national rage for outdoor eating. 3 units fully repay your small investment. All equipment and easy, step-by-step instructions supplied. You buy only sand, cement and flue lining from your building supply dealer. Thousands of prospects all around you . . . so get started now. For full information just fill in and mail the coupon. No obligation.

**CASH COMES
ROLLING IN!**

Demand for outdoor barbecues now growing by leaps and bounds . . . and the BIG PROFITS are yours for the asking. Act now. Get full information. Fill in and mail the coupon!



H. SOKOLIS, Dept. PS-458
928 Cherry Lane, Southampton, Pa.

Gentlemen: Rush complete details re your equipment for producing high-profit Cobbled Concrete Barbecues.

Name _____
Street or R. D. _____
Town _____ Zone _____ State _____

Your boat is safe

with

"PERMA-DOCK" MOORING BARS

Small craft are safely, conveniently moored to docks with Perma-Dock Mooring Bars. Strong springs attach to bow and stern . . . boat rides easily with waves yet never bumps or rubs dock. Bars are easily attached to dock . . . fold flat when not in use.

"PERMA-DOCK" METAL BRACKETS . . . offer a quick, low cost way to erect and take down a stronger dock without ever working in water!



Write for Circular on "Perma-Dock" dock brackets, float brackets, mooring bars, ladders, outboard motor carts and hoists.



Central Machine Works Co. 1236 Central Avenue, Minneapolis 13, Minn.

LESS THAN WHOLESALE!

HERTER'S

Large Volume
Direct To You Prices Are The World's Lowest.

20 New Chrome Fiberglass Models —

CANOES • FISHING BOATS • CRUISERS

Thousands of
Marine Items



**FREE
BIG 1958
CATALOG**

DEPT. 3-J-D

HERTER'S WASECA, MINN. SINCE 1893



ALL NEW SUPER GRAPHIC® 4x5

One look at the Super Graphic 45 will tell you that this brand new camera means business! Though smaller than its predecessor, the Pacemaker Graphic, it has even greater versatility while maintaining the 4x5 format. Size and shape have been designed for utmost user convenience. All locks and releases are convenient to adjust, large enough and properly shaped for easy operation. Swings, tilts and shifts have "click stop" neutral positions. An electric tripping button for shutter and flash is located convenient to the left hand. Focusing scale and automatic flash calculator are on top of the camera. All flash and shutter connections are internally wired, eliminating dangling cords. Revolving back lets you take horizontally or vertically composed pictures with equal ease. See this advanced new camera at your Graflex dealer's or write Dept. PS-48, Graflex, Inc., Rochester 3, N. Y., for further information.

More Features...

- Automatic flash setting calculator.
- Front standard swings horizontally, tilts forward or backward, rises and shifts.
- New focusing hood for quiet, one-handed operation.
- Large, easy-to-handle coupled rangefinder cam and simplified mechanism for easy changing of cams.
- Integral rangefinder works even with wide angle lenses.
- Revolving back accepts all Graflex-made film accessories.
- Polarized 3-pin cord outlet in camera body connects to Graflite and Stroboflash and eliminates cords dangling from shutter.



Revolving back turns 360° in either direction. Click stops at horizontal and vertical positions.



Front standard swings horizontally, tilts forward or backward, rises and shifts.



Electrical body release for tripping shutter, Stroboflash and Graflite. Internal power supply and wiring.

GRAFLEX® *Price-Winning Camera*
A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION



APRIL 1958 81



**no drag
on the rag**

**shine faster with
all-new Carnu**

Shines the deep-down color back better than ever before!

New Johnson's Wax formula wipes off as easy as it wipes on. Actually cleans with less friction—speeds up the shine. All-new Carnu is easier on the finish, easier on you. Cleans as it shines—in one easy go!



JOHNSON'S WAX, *CARNU** AND **DEEP GLOSS** ARE REGISTERED TRADEMARKS OF S. C. JOHNSON & SON, INC.



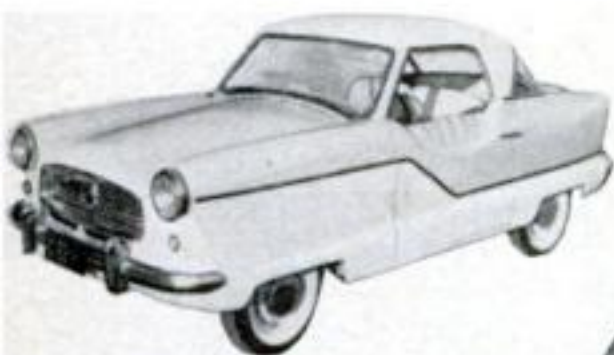
HILLMAN MINX



ANGLIA

Facts, figures and driver reports on

8 Best-Selling Small Cars



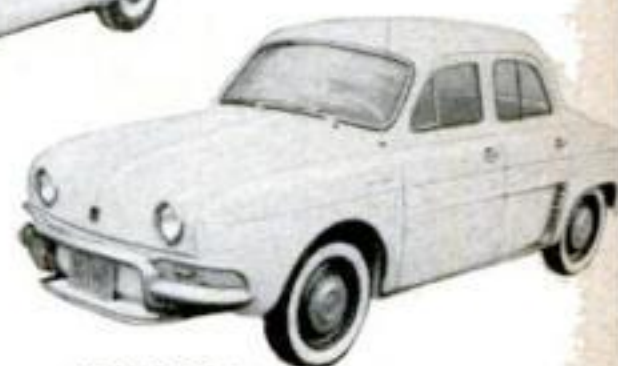
METROPOLITAN



OPEL OLYMPIA REKORD



RAMBLER
AMERICAN



RENAULT
DAUPHINE



VAUXHALL
VICTOR



VOLKSWAGEN

By Devon Francis

ON THE following pages POPULAR SCIENCE presents the results of tests on eight small sedans selling for less than \$2,000. These tests cover their top speeds, acceleration and gas mileage, both at a constant highway speed and in stop-and-go driving, with two persons aboard.

Five of the eight cars are the biggest-selling sedans, over here, among the European imports. Two of the remaining three are made by European branch factories of U. S. manufacturers and widely distributed here through dealers in domestic cars. The eighth car is the only vehicle made in this country that is comparable in size with the European imports.

This study is concerned with price, performance, comfort levels and ease of handling. In weight, size, ride, economy and price, the little cars differ widely. They do share these characteristics: They are mechanically simple, and therefore are easy to keep in running trim. They are lighter in weight and their power output is low. So they are economical of fuel. All use regular gasoline, as opposed to extra-cost, premium grades. Most of them are, by a U. S. yardstick, shy on acceleration and speed. By and large, they are better made than U. S. cars. Reason: More rigid quality-control.

Regarding the charts: Prices are "factory-suggested retail" at New York, the main port of importation, and in some instances also at Gulf ports. Prices run up to almost \$200 higher at West Coast ports and commensurately more at inland points where overland freight is a factor. Prices include federal excise tax and dealer "preparation and handling" charges, but no state or local taxes. The Rambler American price is retail at the factory, Kenosha, Wis.

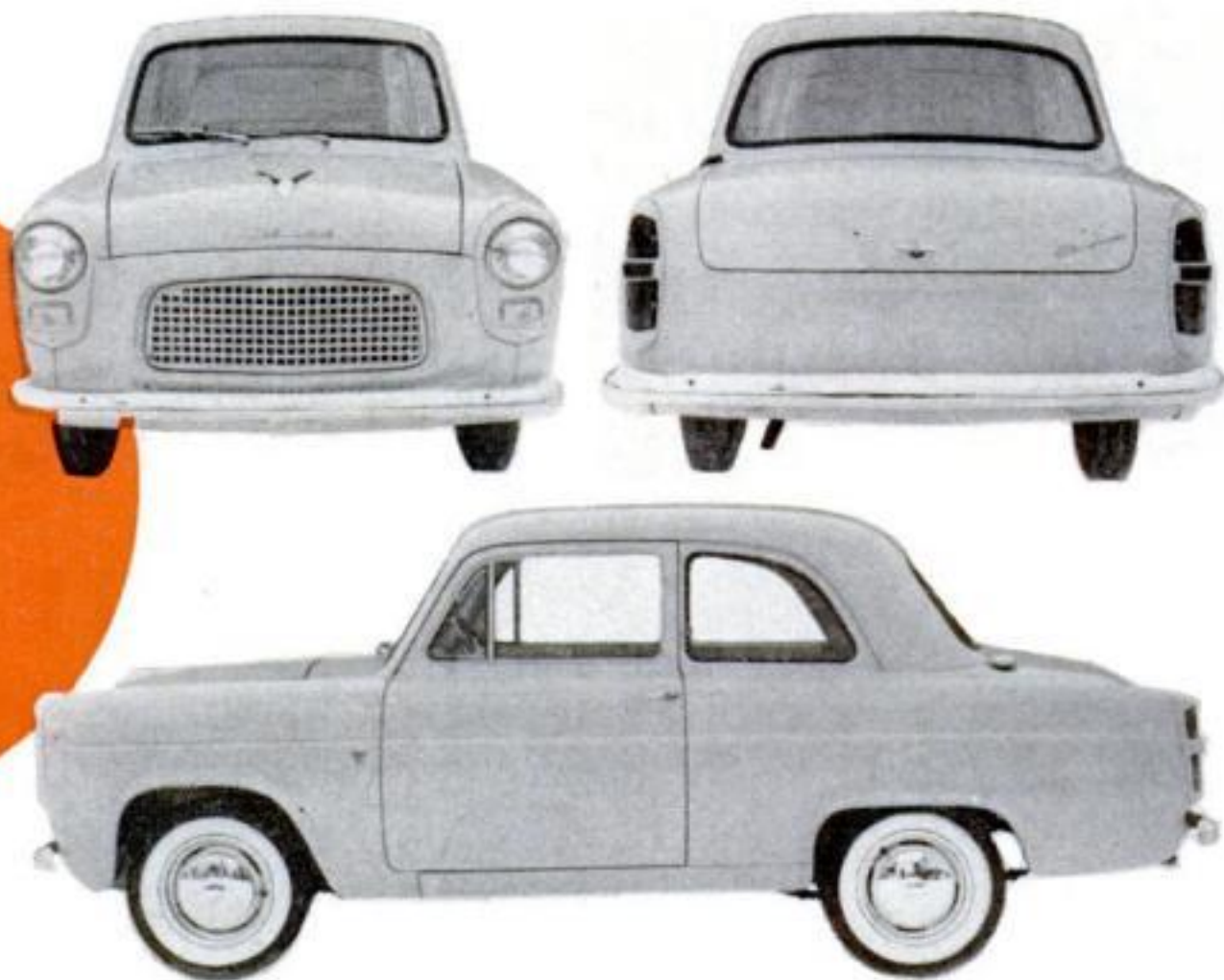
Speedometer readings given are uncorrected for instrument error. But speedometer error at 60 miles an hour is cited.

Acceleration times given are through all gears, using optimum-performance shift points.

Fuel-consumption readings are based on refill at the pump.

**For full report
on each car,
see the next
eight pages**

Anglia



Specifications

Made in: England. Price: \$1,539.
Number of passengers: four.

Performance

Fuel consumption: stop-and-go, 23.2 m.p.g.; constant 50 m.p.h., 28.8 m.p.g.

Top speed: 70. Speedometer error: At indicated 60 m.p.h., car speed was 56 m.p.h.

Acceleration: 0-50 m.p.h., 19.2 sec.; 0-60, 28 sec.; 35-55, 12.3 sec.; 40-60, 14 sec.

Engine

Four-cyl. flathead; 36 hp. at 4,500 r.p.m.; torque, 52 lb.-ft. at 2,500 r.p.m.; bore and stroke, 2.5 X 3.64 in.; displacement, 71.55

cu. in.; compression ratio, 7:1; cooling system, water; engine position, front; car weight per hp., 49.5 lb.; fuel capacity, 8.5 gal.

Transmission, chassis, running gear

Forward speeds, three; transmission ratios (:1), 3.90, 2:01, 1; rear-axle ratio, 4.42; springing, coils in front, semi-elliptics in rear; steering ratio, 2¼ turns lock to lock; diameter of turning circle, 32.5 ft.; brake-lining area, 76.8 sq. in.; tire size, 5.20 X 13.

Weights and dimensions

Curb weight, 1,782 lb.; outside dimensions: wheelbase, 87 in.; over-

all length, 149.2 in.; width, 60.7 in.; height, 58.7 in.; tread, front 48 in., rear 47.5 in.; ground clearance, 7 in.

Inside dimensions: hip room, front 46 in., rear 36 in.; leg room, front 43 in., rear 36 in.; head room, front 36.7, rear 33.5 in.; distance, steering wheel to seat cushion with seat in mid-position, 6.7 in.; driver's-seat horizontal adjustment, 4 in.

Optional equipment: radio, heater, whitewall tires, temperature gauge, semi-automatic clutch, leather upholstery, bigger-capacity fan.

List of dealers available from: Ford Motor Co., Foreign Products Branch, 34 Exchange Pl., Jersey City 2, N. J.

"Well-built—but it proved to be a handful in a brisk crosswind"

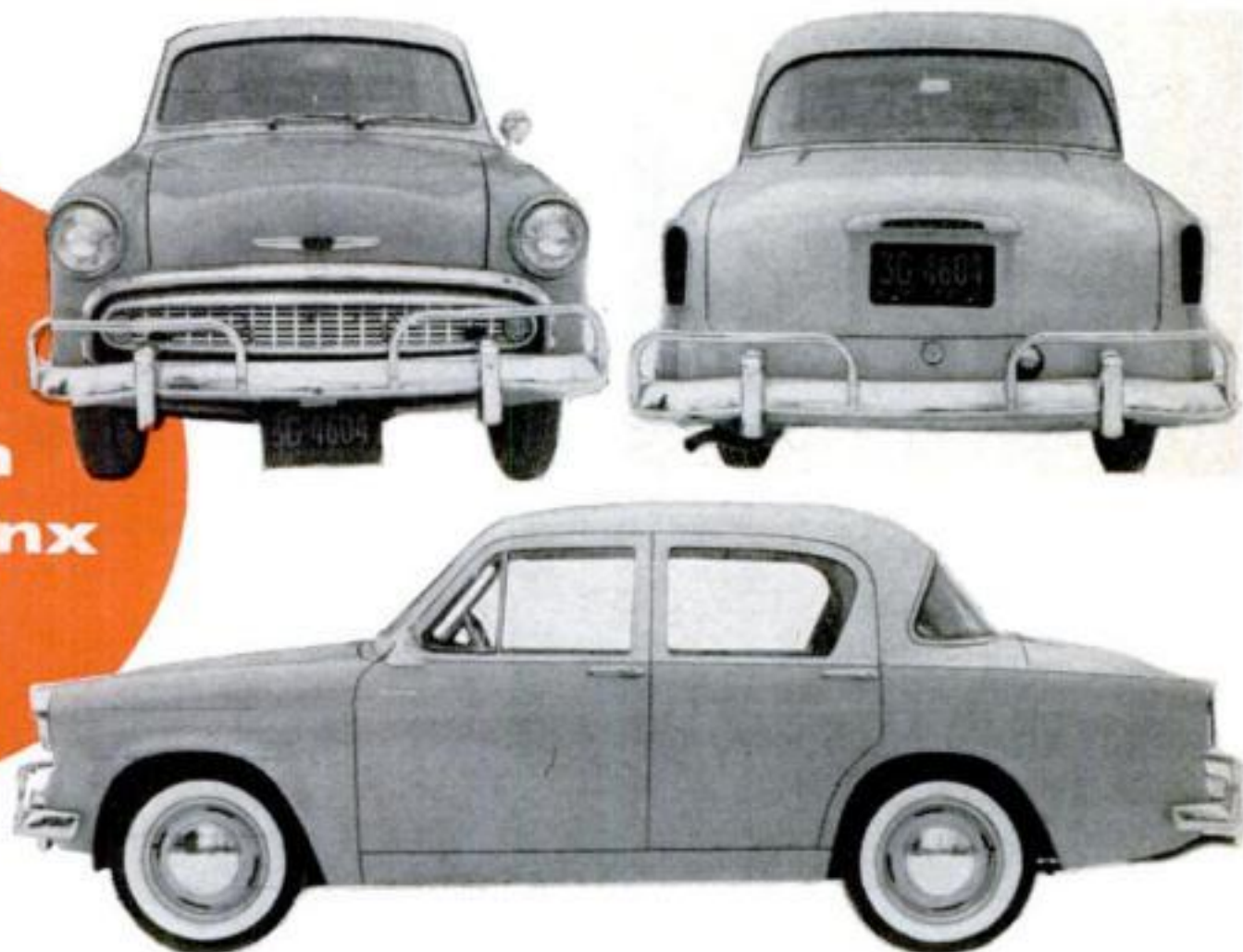
Comment: This is the most austere—and the cheapest—of the British-made Fords. Even the Volkswagen must take second place to it as an unadorned, strictly utility vehicle. The Anglia is well built. Its noise level is exceptionally low. The outstanding attribute of this foreshortened little vehicle is its ability to scoot around, especially on wet or snowy footing. Beyond that, the buyer must expect no more than the low price entitles him to.

The engine power is too meager for a three-speed transmission. On the car tested, the clutch was inclined to grab. The vibration level was high, and considerable road shock was transmitted to the steering wheel. The gearshift linkage in-

vited clashing against reverse when the transmission-mounted shift lever was moved from first to second. The heater, somewhat primitive and unsatisfactory in output, was so mounted as to interfere with the accelerator toe of a big-footed motorist.

Because the car is so light, it proved to be a handful in a brisk crosswind. It stored relatively little rolling energy. On the other hand, the visibility was good, and no one could quarrel with the riding qualities. The parallel-operating wipers afforded extra swept area on the windshield. As with all the extra-small imports, the Anglia poses the question of an additional driving hazard—it's harder for other motorists to see it.

Hillman Minx



Specifications

Made in: England. Price, \$1,849 (a stripped version is \$1,699). Number of passengers: four.

Performance

Fuel consumption: stop-and-go, 20.7 m.p.g.; constant 50 m.p.h., 32.3 m.p.g.

Top speed: 80. Speedometer error: At indicated 60 m.p.h., car speed was 57.2 m.p.h.

Acceleration: 0-50 m.p.h., 15.8 sec.; 0-60, 23 sec.; 35-55, 11.2 sec.; 40-60, 15.1 sec.

Engine

Four-cyl. OHV; 51 hp. at 4,400 r.p.m.; torque, 72 lb.-ft. at 2,200 r.p.m.; bore and stroke, 3.00 X 3.00

in.; displacement, 85 cu. in.; compression ratio, 8:1; cooling system, water; engine position, front; car weight per hp., 43.1 lbs.; fuel capacity, 8.7 gal.

Transmission, chassis, running gear

Forward speeds, four; transmission ratios (:1), 3.56, 2.47, 1.49, 1; rear-axle ratio, 4.78; springing, coils in front, semi-elliptics in rear; steering ratio, three turns lock to lock; diameter of turning circle, 34.2 ft.; brake-lining area, 92 sq. in.; tire size, 5.60 X 15.

Weights and dimensions

Curb weight, 2,200 lb.; outside

dimensions: wheelbase, 96 in.; overall length, 162 in.; width, 60.7 in.; height, 59.5 in.; tread, front 49 in.; rear 48.5 in.; overhang, front 26 in., rear 40 in.; ground clearance, 7 in.

Inside dimensions: hip room, front 50.5 in., rear 51 in.; leg room, front 31 in., rear 34.2 in.; head room, front 33 in., rear 30 in.; distance, steering wheel to seat cushion with seat in mid-position, 5.5 in.; driver's-seat horizontal adjustment, 5 in.

Optional equipment: radio, heater, clock, oil gauge, ammeter, whitewall tires, automatic clutch.


List of dealers available from: Rootes Motors, Inc., 505 Park Ave., New York 22, N. Y.

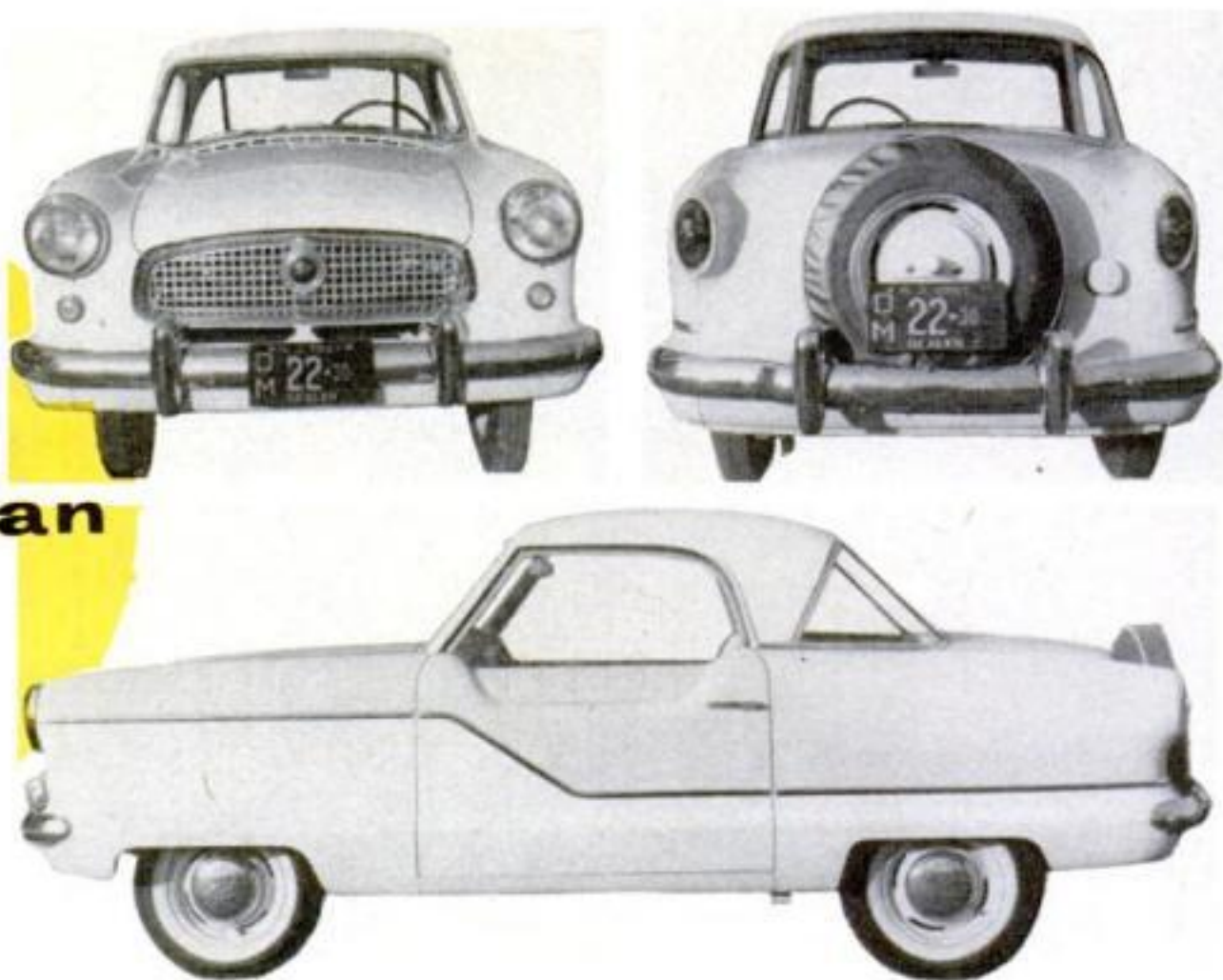
"A recommended buy despite a number of driver annoyances"

Comment: The engine is quiet, smooth and full of snap. Its output in the pinches is a surprise and delight to the driver who has sampled other European fly-weight power plants. The body construction is solid. Seat room, front and rear, is satisfactory. Driver visibility is good. The heater is more than adequate. The major instruments, centered on the panel (to accommodate a right-hand steering-wheeled installation in England, and left-hand abroad), call for too much eye travel.

The shift pattern, exactly the opposite to that in the U. S. with the added complication of another forward gear, is annoying. Starting in second gear is permissible at light load. The gears clash in

speed-shifting between first and second, and second and third. First gear should be synchronized. Pedal pressures are light and easy, and the pedals are adequately spaced. The clutch is hydraulically operated. The electric wipers need a second speed. Their parallel-operation overlap, however, affords a superior swept area. The suspension is somewhat stiff. The steering ratio is too fast for easy parking effort. The owner's-handbook injunction to use premium gas is misleading—it applies only to low-octane European fuels. Regular U. S. gas is okay.

In the opinion of the writer, the Hillman—at the price—probably is the best buy among the more popular foreign cars selling under \$2,000. 



Metropolitan

Specifications

Made in: England. Price: \$1,626.
Number of passengers: two.

Performance

Fuel consumption: stop-and-go, 22.1 m.p.g.; constant 50 m.p.h., 33.5 m.p.g.

Top speed: 71. Speedometer error: At indicated 60 m.p.h., car speed was 59 m.p.h.

Acceleration: 0-50 m.p.m., 12 sec.; 0-60, 17.4 sec.; 35-55, 8.8 sec.; 40-60, 10 sec.

Engine

Four-cyl. OHV; 55 hp. at 4,600 r.p.m.; torque, 82 lb.-ft. at 2,400 r.p.m.; bore and stroke, 2.87 X 3.5 in.; displacement, 90.89 cu. in.;

compression ratio, 8.3:1; cooling system, water; engine position, front; car weight per hp., 35 lb.; fuel capacity, 10.5 gal.

Transmission, chassis, running gear

Forward speeds, three; transmission ratios (:1) 2.84, 1.49, 1; rear-axle ratio, 4.22; springing, coils in front, semi-elliptics in rear; steering ratio, 2¾ turns lock to lock; diameter of turning circle, 35 ft.; brake-lining area, 76.8 sq. in.; tire size, 5.20 X 13.

Weights and dimensions

Curb weight, 1,938 lb.; outside dimensions: wheelbase, 85 in.; over-

all length, 149.5 in.; width, 61.5 in.; height 54.5 in.; tread, front 45.3 in., rear 44.8 in.; overhang, front 28.4 in., rear 36.1 in.; ground clearance, 6 in.

Inside dimensions: hip room, 49.7 in.; leg room, 41.7 in.; head room, 35.7 in.; distance, steering wheel to seat cushion with seat in mid-position, 6.7 in.; driver's-seat horizontal adjustment, 4 in.

Optional equipment: radio, heater, whitewall tires; standard equipment includes Continental spare, two-tone paint.

List of dealers available from: Sales Department, American Motors Corp., 14250 Plymouth Rd., Detroit 32.

"A watch-charm Rolls, with a quoted price that's misleading"

Comment: This car is a sort of watch-charm Rolls Royce—with all the disadvantages accruing from the attempt at shrinkage. It's saucy, with an extraordinarily good power-for-weight ratio. For a European, low-priced vehicle, it's a bomb on acceleration. Its short wheelbase puts it at the top of its class in maneuverability, with a minimum of clutch effort.

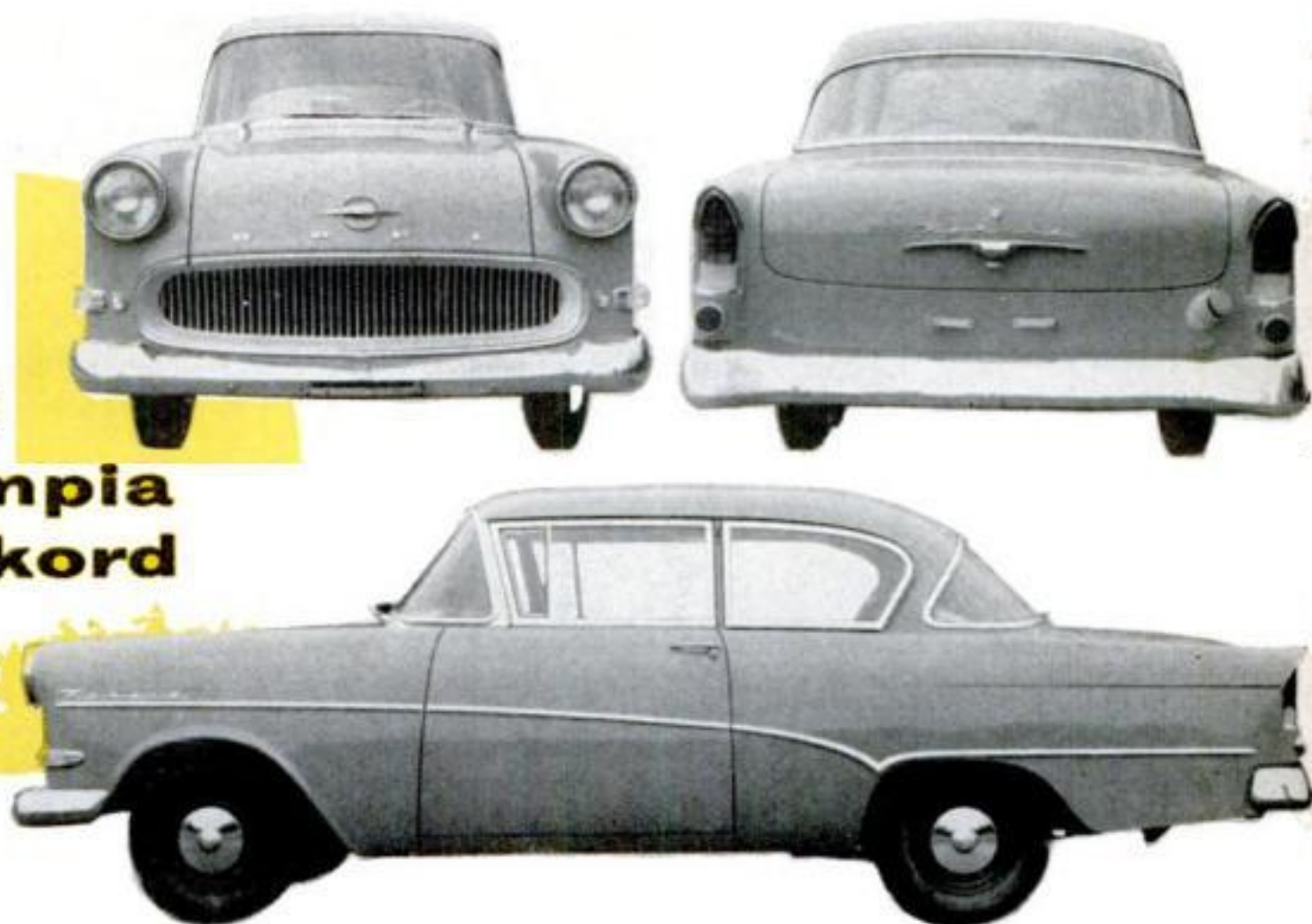
Built by Austin for American Motors and powered by an Austin A-50 engine, the car is astonishingly well equipped. It exudes an air of luxury-in-miniature.

Even a Continental spare-tire mount—now in vogue again—is standard equipment. So is a cigar lighter, missing on most low-cost imports. But, naturally, the

Metro pitches on rough roadways. It seats only two unless somebody wants to lodge an infant on the unsprung cushion in back. An absence of vent windows makes fresh air a problem, especially in wet weather. The car tested tended to wander in crosswinds. The turn signals refused to cancel and the wipers did not return when switched off. The radio stations "drifted" on warmup. The lack of an engine-heat indicator was bothersome. Road noise was excessive, but shock was nicely damped out.

The quoted price is misleading—for the present, anyway, it's impossible to buy a Metro without radio, heater and whitewalls. So the car should be advertised at a true price of \$1,774.

Opel Olympia Rekord



Specifications

Made in: Germany. Price: \$1,987. Number of passengers: four.

Performance

Fuel consumption: stop-and-go, 29.6 m.p.g.; constant 50 m.p.h., 31.4 m.p.g.

Top speed: 71 m.p.h. Speedometer error: At indicated 60 m.p.h., car speed was 59 m.p.h.

Acceleration: 0-50 m.p.h., 16 sec.; 0-60, 22.2 sec.; 35-55, 12.5 sec.; 40-60, 13 sec.

Engine

Four-cyl. OHV; 56 hp. at 4,200 r.p.m.; torque, 84 lb.-ft. at 2,000 r.p.m.; bore and stroke, 3.15 X 2.91 in.; displacement, 90.8 cu. in.; com-

pression ratio, 7.5:1; cooling system, water; engine position, front; car weight per hp., 35.6 lb.; fuel capacity, 10.5 gal.

Transmission, chassis, running gear

Forward speeds, three; transmission ratios (:1), 3.23, 1.68, 1; rear-axle ratio, 3.9:1; springing, coils in front, semi-elliptics in rear; steering ratio, 2.5 turns lock to lock; diameter of turning circle, 35 ft; brake-lining area, 109.1 sq. in.; tire size, 5.60 X 13.

Weights and dimensions

Curb weight, 1,995 lb.; outside dimensions: wheelbase, 100 in.; overall length, 174 in.; width, 63.6

in.; height, 56.7 in.; tread, front 49.6 in., rear 50 in.; overhang, front, 28 in., rear 45.9 in.; ground clearance, 6.7 in.

Inside dimensions: hip room, front 52.7 in., rear 53 in.; leg room, front 43.3 in., rear 39.3 in.; head room, front 36 in., rear 34.8 in.; distance, steering wheel to seat cushion with seat in mid-position, 5.7 in.; driver's-seat horizontal adjustment, 3.5 in.

Optional equipment: Radio, back-up lights, outside mirror, bumper guards, windshield washer. Heater is standard.

List of dealers available from: Sales Department, Buick Motor Division, Flint 2, Mich.

"A modernized Model A with a fresh bloom—but overpriced"

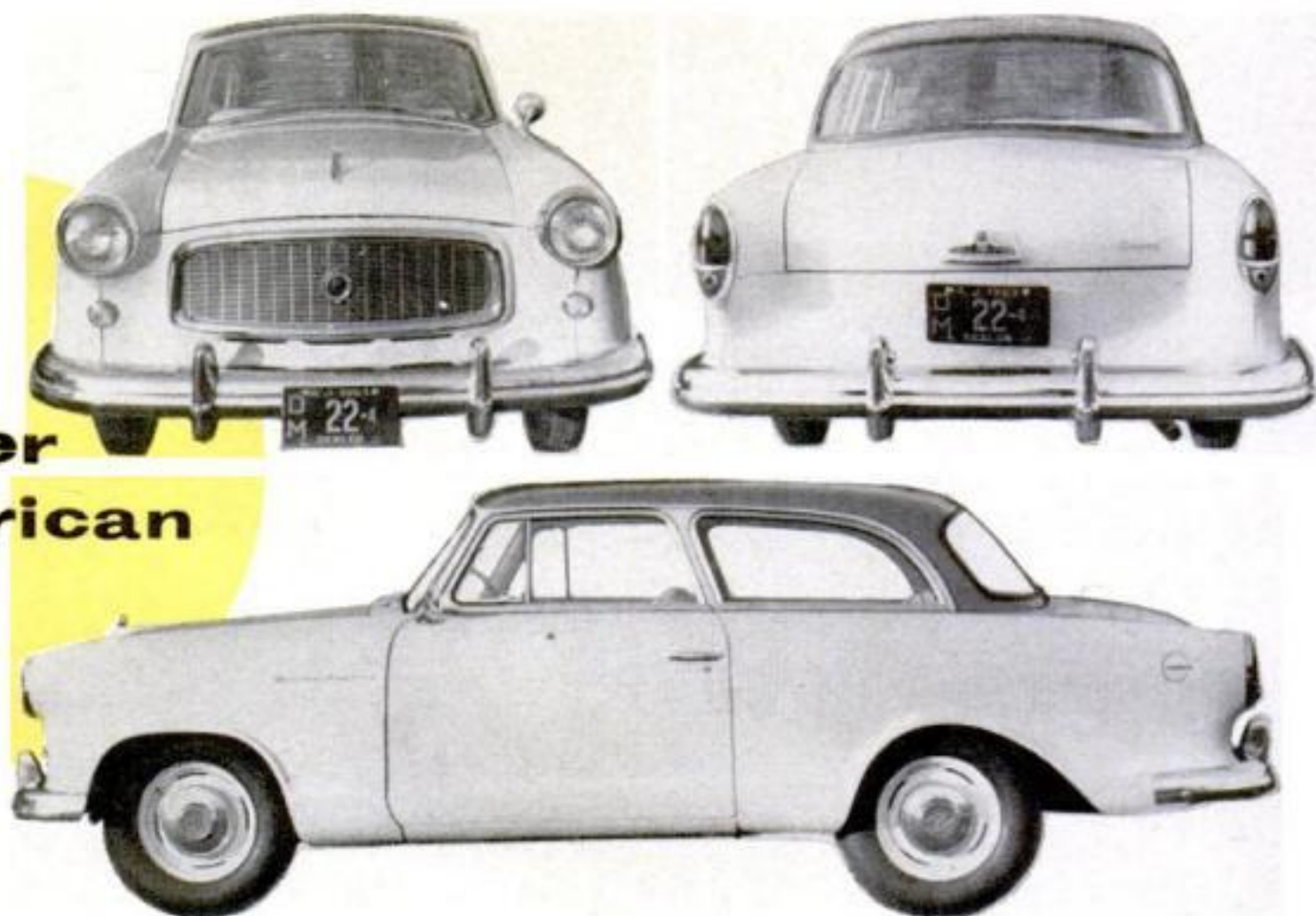
Comment: The best of the Opel is its looks, ride and items of passenger comfort. The worst of it is the price—it costs too much compared with other European automobiles in its price group and with, indeed, comparably equipped U. S. cars.

As described in POPULAR SCIENCE in March, this new little import is lively, comfortable and easy to drive. The first gear—cheers to GM—is synchronized. The accelerator pedal is sized so a man can get his foot on it. By European standards, the Opel is roomy. By U. S. standards, it's a sort of modernized Model A with a fresh bloom. By all odds, it conforms closest, among the imports, to what a customer over here thinks an automobile should be.

The cautious buyer can find fault with it. Its speed and acceleration don't match, for instance, those of the Hillman—despite a slightly bigger engine and considerably lower weight. That's due in part to transmission and axle ratios. The car tested couldn't be pushed much beyond an indicated 70 miles an hour but—to its credit—it didn't sweat in reaching that. The heating was only marginal on a cold day. The ribbon-type speedometer was hysterical, and speeds had to be averaged-out between swings.

The flow of Opels from the factory is skimpy and, as with many of the imports, the replacement-part problem should be explored thoroughly before purchase.

Rambler American



Specifications

Made in: U. S. Price: \$1,789 (for Deluxe; a Super is \$1,874). Number of passengers: five.

Performance

Fuel consumption: stop-and-go, 21.8 m.p.g.; constant 50 m.p.h., 24.6 m.p.g.

Top speed: 83 m.p.h. Speedometer error: At indicated 60 m.p.h., car speed was 56 m.p.h.

Acceleration: 0-50 m.p.h., 10.2 sec.; 0-60, 15 sec.; 35-55, 7 sec.; 40-60, 8 sec.

Engine

Six-cyl. flathead; 90 hp. at 3,800 r.p.m.; torque, 150 lb.-ft. at 1,600 r.p.m.; bore and stroke, 3.12 X 4.25 in.; displacement, 195.6 cu. in.;

compression ratio, 8:1; cooling system, water; engine position, front; car weight per hp., 28.5 lb.; fuel capacity, 20 gal.

Transmission, chassis, running gear

Forward speeds, three; transmission ratios (:1), 2.61, 1.63, 1; rear-axle ratio, 3.78; springing, coils in front, semi-elliptics in rear; steering ratio, $4\frac{1}{3}$ turns, lock to lock; diameter of turning circle, 36 ft.; brake-lining area, 139.4 sq. in.; tire size, 5.90 X 15.

Weights and dimensions

Curb weight, 2,571 lb.; outside dimensions: wheelbase, 100 in.; overall length, 178.2 in.; width, 73

in.; height, 57.3 in.; tread, front, 54.6 in., rear 55 in.; overhang, front 31 in., rear 46.9 in.; ground clearance, 6.7 in.

Inside dimensions: hip room, front 58 in., rear 45.2 in.; leg room, front 44 in., rear 37.5 in.; head room, front 35.2 in., rear 34 in.; distance, steering wheel to seat cushion with seat in mid-position, 7 in.; driver's-seat horizontal adjustment, 6 in.

Optional equipment: overdrive, automatic transmission, heater, radio, tinted glass, reclining seat, bigger tires, oil-bath cleaner, etc.

List of dealers available from: Sales Dept., American Motors, 14250 Plymouth Rd., Detroit 32.

"Probably the best of the small cars at the price"

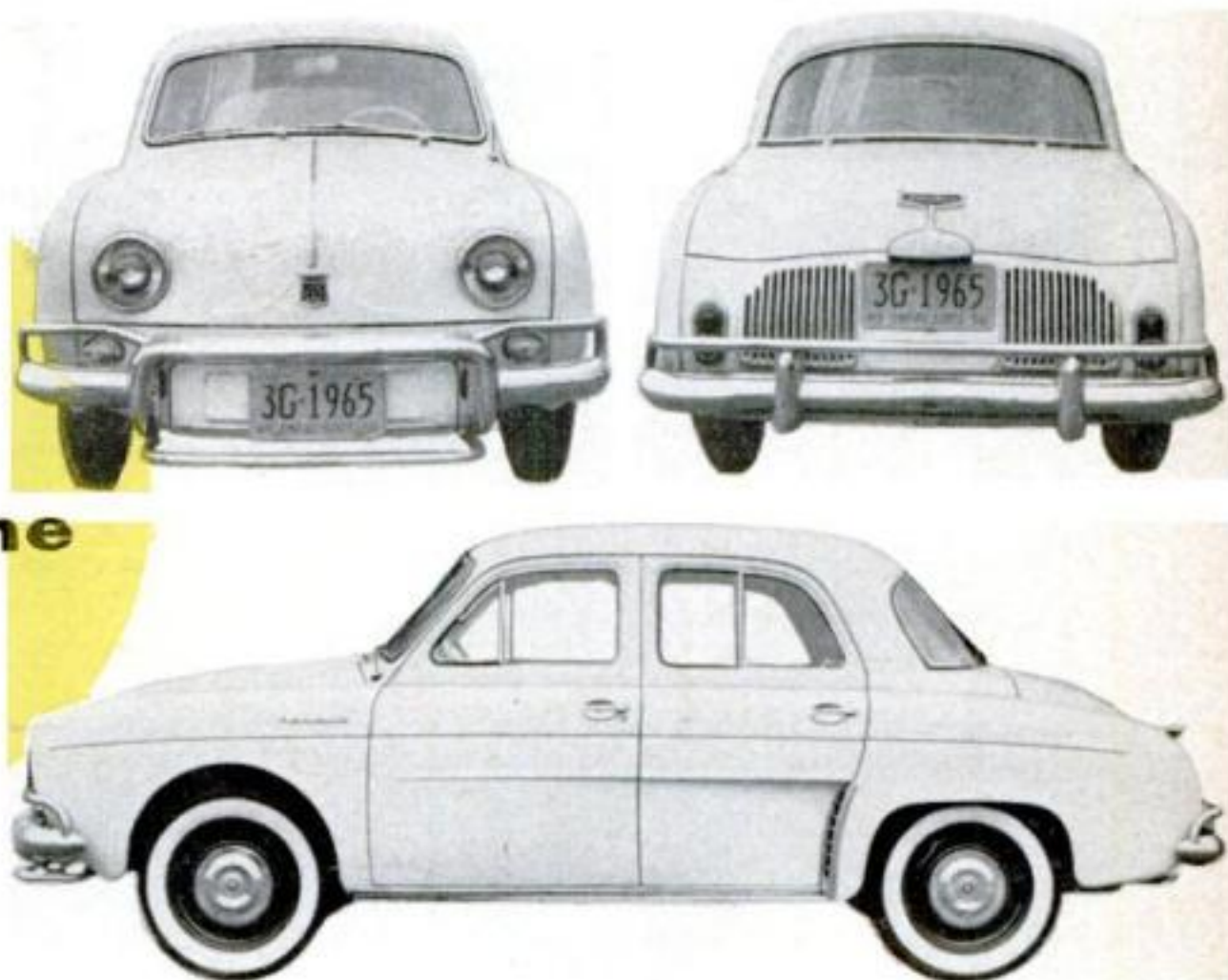
Comment: This is the Rambler that was introduced in 1951 and discontinued in 1955. The changes are negligible. The flathead engine (the only Six among the eight cars tested, the rest having four cylinders), designed 18 years ago, still has sparkle.

The car requires surprisingly little shifting. Gear engagement is smooth and positive, matched only by the Opel and Volkswagen. Instruments are grouped nicely in front of the driver. The heater controls are simple and the volume of warm air ample, but the fan was noisy. Body construction and door fits were superior, as in most frameless cars. Little road shock is transmitted to the steering wheel. Height of the entrance room is

poor. Head room is scanty. The speedometer needle is stable but the dial graduations need improvement. Unlighted panel controls make night driving a chore for the person not acquainted with the car. The dimmer switch is too close to the clutch pedal. The car lugs below 15 miles an hour. Visibility all around is excellent.

This was one of only two cars of the eight tested that had not been run-in. (The other was the Metropolitan.) The odometer showed only 100 miles. Therefore, the buyer can expect better performance after 3,000 or 4,000 miles than is indicated here. In the writer's opinion, the Rambler American probably is the best buy, at the price, among the eight.

Renault Dauphine



Specifications

Made in: France. Price: \$1,645.
Number of passengers: four.

Performance

Fuel consumption: stop-and-go, 28.2 m.p.g.; constant 50 m.p.h., 30 m.p.g.

Top speed: 74. Speedometer error: At indicated 60 m.p.h., car speed was 57 m.p.h.

Acceleration: 0-50 m.p.h., 19 sec.; 0-60, 29 sec.; 35-55, 17.8 sec.; 40-60, 19.8 sec.

Engine

Four-cyl. OHV; 32 hp. at 4,250 r.p.m.; torque, 48.3 lb.-ft. at 2,000 r.p.m.; bore and stroke, 2.28 X 3.14 in.; displacement, 51.5 cu. in.; com-

pression ratio, 7.25:1; cooling system, water; engine position, rear; car weight per hp., 43.4 lb.; fuel capacity, 8.5 gal.

Transmission, chassis, running gear

Forward speeds, three; transmission ratios (:1), 3.7, 1.8, 1.07; rear-axle ratio, 4.37; springing front and rear, coils; steering ratio, 4¼ turns lock to lock; diameter of turning circle, 29.1 ft.; brake-lining area, 55.2 sq. in.; tire size, 5.00 X 15.

Weights and dimensions

Curb weight, 1,389 lb.; outside dimensions: wheelbase, 89.3 in.; overall length, 155.3 in.; width, 60

in.; height, 56.7 in.; tread, front 49.2 in., rear 48 in.; overhang, front 29.5 in., rear 33.5 in.; ground clearance, 6 in.

Inside dimensions: hip room, front 20 in. each (split seats), rear 48 in.; leg room, front 40 in., rear 36 in.; head room, front 37.5 in., rear 35.5 in.; distance, steering wheel to seat cushion with seat in mid-position, 7.8 in.; driver's-seat horizontal adjustment, 5 in.

Optional equipment: automatic clutch, whitewall tires, sun roof, radio. Heater and automatic choke are standard.

List of dealers available from: Renault, Inc., 425 Park Ave., New York 22, N. Y.

"It has exquisite touches—this car should be a better buy"

Comment: For an "Americanized" vehicle with a Champs Elysées accent, this car should be a better buy than it is. It has a host of exquisite touches. You can lock the steering wheel with the ignition key—an ideal frustration for thieves. Choking is automatic. The engine, for its size, is one of Europe's best. Driver visibility is good. The ride is soft, the cornering excellent. Overall maneuverability may well be tops among the more popular imports. The owner manual is the most complete.

Yet the Dauphine incorporates a bag of annoyances peculiar to itself. On the car tested, too much reach was required in moving the transmission-mounted shift lever. There was inadequate toe clear-

ance above the pedals. In an anxiety to shrink the body, the maker intrudes the wheel wells into the front compartment. Passengers have to stoop-and-squat to get in. The doors lack hold-opens. The transmission whines. Too-liberal use of plastics cheapens an otherwise attractive interior, and inclusion of two-toned horns for town and country is—for the U. S. A.—pure caprice.

But the real fault of this car is low power and too-ambitious transmission and axle ratios. Above 40 miles an hour, the remarkably quiet little engine begins sighing over its chores. It has a marked reluctance for passing at highway speeds. Will Paris please synchronize that first gear?

Vauxhall Victor



Specifications

Made in: England. Price: \$1,987. Number of passengers: four.

Performance

Fuel consumption: stop-and-go, 29.9 m.p.g.; constant 50 m.p.h., 32 m.p.g.

Top speed: 80. Speedometer error: At indicated 60 m.p.h., car speed was 57 m.p.h.

Acceleration: 0-50 m.p.h., 20 sec.; 0-60, 26.4 sec.; 35-55, 10.6 sec.; 40-60, 11.2 sec.

Engine

Four-cyl. OHV; 55 hp. at 4,200 r.p.m.; torque, 78 lb.-ft. at 2,000 r.p.m.; bore and stroke, 3.12 X 3.00 in.; displacement, 92 cu. in.; com-

pression ratio, 7.8:1; cooling system, water; engine position, front; car weight per hp., 38.9 lb.; fuel capacity, 9.6 gal.

Transmission, chassis, running gear

Forward speeds, three; transmission ratios (:1), 3.18, 1.63, 1; rear-axle ratio, 4.12; springing, coils in front, semi-elliptics in rear; steering ratio, $3\frac{3}{4}$ turns lock to lock; diameter of turning circle, 34 ft.; brake-lining area, 92 sq. in.; tire size, 5.60 X 13.

Weights and dimensions

Curb weight, 2,140 lb.; outside dimensions: wheelbase, 98 in.; over-

all length, 166 in.; width, 62 in.; height, 58 in.; tread front and rear, 50 in.; overhang, front 26 in., rear 42.6 in.; ground clearance, 6.5 in.

Inside dimensions: hip room, front and rear 52 in.; leg room, front 42 in., rear 41 in.; head room, front and rear, 35 in.; distance, steering wheel to seat cushion with seat in mid-position, 6.8 in.; driver's-seat horizontal adjustment, 4 in.

Optional equipment: radio, windshield washer, outside mirror. Heater, undercoating standard.

List of dealers available from: Sales Department, Pontiac Motor Division, Pontiac 11, Mich.

"The coachwork is superb, but acceleration is sluggish"

Comment: The Vauxhall (like the Opel) probably will find the going hard against its small-car competition. It's high-priced. On the credit side, the car is comfortable. Steering, through a small, 16-inch wheel, is firm. The brakes are excellent. Visibility from the driver's seat is superior. The engine is lively. GM wisely synchronized all the forward gears.

But there are debits. The transmission on the car tested shifted hard. Engine warmup was slow. The road shock transmitted to the steering wheel was excessive. The car had front-end wander in wind at high speed. Car weight per horsepower called for a higher axle ratio, or

four speeds. Acceleration was sluggish. Control pedals were adequately spaced but too small—they could be a hazard to a motorist accustomed to bigger ones. Entrance room was sufficient in front but, with a stepdown, meager in the rear. Wave lengths on the radio supplied (to be real picayunish) were graduated in meters, which complicated station-finding, and the thing tuned backward.

On the other hand, luggage space, in Detroit's best tradition, was exceptionally good, and the coachwork superb. The springing met rough roads with dignity. For the driver, anyway, there was ample leg room.

Next month: a special section packed with new slants on



Volkswagen



Specifications

Made in: Germany. Price: \$1,545. Number of passengers: four.

Performance

Fuel consumption: stop-and-go, 32 m.p.g.; constant 50 m.p.h., 43 m.p.g.

Top speed: 73. Speedometer error: At indicated 60 m.p.h., car speed was 56 m.p.h.

Acceleration: 0-50 m.p.h., 17 sec.; 0-60, 30 sec.; 35-55, 12.2 sec.; 40-60, 13 sec.

Engine

Four-cyl. OHV, horizontally opposed; 36 hp. at 3,700 r.p.m.; torque, 56 lb.-ft. at 2,000 r.p.m.; bore and stroke, 3.03 X 2.52 in.; displacement, 72.7 cu in.; compression

ratio, 6.6:1; cooling system, air; engine position, rear; car weight per hp., 51.1 lb.; fuel capacity, 10.5 gal., 1.3 gal. reserve.

Transmission, chassis, running gear

Forward speeds, four; transmission ratios (:1), 3.6, 1.88, 1.23, .82; rear-axle ratio, 4.4; springing, torsion bars, each wheel independent; steering ratio, 2.4 turns lock to lock; diameter of turning circle, 36 ft.; brake-lining area, 94.2 sq. in.; tire size, 5.60 X 15.

Weights and dimensions

Curb weight, 1,802 lb.; outside dimensions: wheelbase, 94.5 in.; overall length, 160 in.; width, 60.5

in.; height, 59 in.; tread, front 50.7 in., rear 49.1 in.; overhang front and rear, 32.7 in.; ground clearance, 6.8 in.

Inside dimensions: hip room, front 19 in. each (split seats), rear 52; leg room, front 43.5 in., rear 36.5 in.; head room, front 38 in., rear 34 in.; distance, steering wheel to seat cushion with seat in mid-position, 7 in.; driver's-seat horizontal adjustment, 6.5 in.

Optional equipment: radio, gas gauge, whitewall tires, leatherette upholstery, outside mirror, etc. Heater is standard.

List of dealers available from: Volkswagen of America, 476 Hudson Terrace, Englewood Cliff, N. J.

"Noisy transmission, but can 200,000 U. S. owners be wrong?"

Comment: The VW has won the popularity sweepstakes among imported cars hands down, and 200,000 U. S. owners can't be wrong. This vehicle is exceptionally well made and rugged. It probably is the most potentially trouble-free car sold here. *But*, always carry a spare fan belt along—belt breakage is the VW's sole design weakness. A big rear window now, for the first time, affords adequate rear visibility. Maneuverability and handling characteristics are excellent. The uninitiated will find the scanty torque output annoying. The front end windwanders when the forward-positioned fuel tank runs low.

An optional gas gauge is welcome. Otherwise, the driver doesn't know that his main tank is dry and that he must turn on his reserve, until the engine sputters and dies.

The springing is hard at light load. The transmission is excessively noisy. On the car tested, the shift lever occasionally jumped out of first gear on long, steep hills. First gear needs synchronizing. A tricky shift into reverse becomes a chore when the gears don't mesh readily. Some owners have nightmares that an elephantine car parked ahead of them will back on to that sloping front end, sight unseen.

used-car buying—and a booklet on how to check a used car

What We Know About



The face of the moon has been painstakingly mapped . . . but what's on the other side?

the Moon — So Far

Look hard, next full moon (April 3, May 3). Our oldest-established permanent satellite looms over the trees, familiar and close, yet mysterious and distant. Contrary to popular opinion, the moon is not always the same. And it's going to change more. We are ready to stretch across 240,000 miles to touch it, test it and put it to work—as an earth-encompassing observation post, as the staging area for expeditions through the universe.

What is the moon like? We now know about just one side. Surprisingly, we know that side very well, better than some parts of the earth. Here are the facts: fascinating details painstakingly established, puzzling mysteries waiting for explorers to solve. Embark below for your armchair tour of Moon Number One.

"LEIBNITZ MOUNTAINS. The highest peaks of all, outranking Everest . . . **THE SEA OF FERTILITY.** One of the larger seas of the Western Hemisphere . . . **NEWTON.** The deepest of the craters . . ." Absorbed in the scenic wonders described in your guidebook, you may be unprepared for an outstanding impression of your first visit to the moon.

That's the powder. A blanket of it covers everything, even steep slopes of jagged mountains. Perhaps a foot deep, the glassy stuff yields underfoot like quicksand, and you must learn the knack of getting around in it. Static charges make it cling to your space suit and the window of your space helmet. Although fine as face powder, it isn't like dust, since there's virtually no air for it to float in. It's an odd sight to see the powder settle instantly, after you stir it up by wallowing through it or by skiing over it.

WHAT'S on the moon—the powder and the rest—will become firsthand experience as soon as rocket ships begin plying outward from earth's man-made space stations. For it stands to reason that our nearest celestial neighbor, whose average distance is only 238,857 miles, will be the first one visited by spacemen. So declares a British astronomer, Patrick Moore, secretary of the British Astronomical Association's lunar section, and a leading member of the British Interplanetary Society.

His book, *A Guide to the Moon*, offers

would-be voyagers to Luna, by telescope or spaceship, a veritable travel manual. Places they should visit, and sights they'll see, are described in the light of recent findings.

Pointed out, too, are mysteries of the moon that may be fully solved only when the first rocket ship blasts down to a landing: Is there life on the moon? Has it any atmosphere? Are volcanoes still active? What's on the other side?

Today, these questions remain unanswered, even though the face of the moon that is turned toward us has been mapped better than the interior of Greenland. To an observer at the world's most powerful telescope, the moon appears only 24 miles away. The best photographs of its rugged and pitted surface reveal details only a few yards across. Enjoying such an excellent view of the moon's 2,160-mile-wide disk, astronomers have discerned more than 10,000 different features.

Upward of 700 of the most prominent ones have received names. The moon's "seas," "oceans," "bays," and "marshes" once were believed to be sheets of water. Today we know there's no water on the moon, and these great dark areas are vast plains—but early observers' fanciful names for them have stuck. Craters bear the names of scientists and other notables, past and present, with mythological characters thrown in; and some mountains are named after famous ranges on earth.

If explorers were ready to start for the moon today, they could take along splen-

did maps of these surface features. Probably the best, by Dr. H. P. Wilkins, British astronomer, was published in a 100-inch-diameter edition in 1951.

And an expedition might do well to carry the *latest* maps! For astronomers no longer consider the moon, as they once did, a dead and changeless world.

That view was held by the two foremost lunar observers of the nineteenth century, Wilhelm Beer and Dr. Johann Mädler. They completed a lunar map and a book on the moon that were masterpieces of thorough work. Then they quit. Why observe the moon further?

THIRTY years later, however, an astronomer looked in vain for a deep six-mile-wide lunar crater called Linné that had been well known to them. Linné had vanished. Where it had been, there was only a white patch, which marks the spot to this day. The most likely guess of many is that landslides, triggered by a "moonquake," caved in the crater's walls and destroyed it.

Imagine a moon explorer witnessing such a cataclysm at close range—cliffs falling away, the lunar landscape changing before his eyes. It would be all the more awesome because it would happen in silence—there cannot be enough air on the moon to carry a whisper of sound.

Close observers have since found other mystifying developments on the moon. In 1939, Moore, the author of the lunar guidebook, himself observed a dense fog that filled a whole crater with a whitish mist. With no water to form clouds, what could the mist be? Carbon dioxide seems a reasonable guess to Moore. And since this gas is given off in volcanic eruptions, mists seen by him and others may mean the moon still has active volcanoes.

The most remarkable object on the moon, perhaps, is the 29-mile-wide, 5,000-foot-deep crater Aristarchus. Its central peak is the moon's brightest spot, even shining starlike after dark by reflected

light from the earth. But still more interesting are dark bands, radiating like spokes from the central peak to the outer walls and up them.

Mysteriously these markings wax and wane. They darken progressively outward after sunrise—then shrink and fade toward the end of the weeks-long lunar "day." Through a powerful telescope, the gray-bordered dark streaks resemble the "canals" of Mars.

Then is there life on the moon—as the famous canals on Mars too may be signs of life? Along surface cracks of volcanic origin, Moore suggests, a primitive form of lunar vegetation—lichens or mosses—may develop under the sun's warming rays and revert to dormancy during the bitter-cold period of darkness. Volcanic carbon dioxide gas leaking from the fissures might sustain its existence.

ALUNAR newspaper would have had sensational news to report in April, 1948. A tiny brilliant flash of orange-yellow light was observed then just within the crater Plato. It must have marked the impact and explosion of a great meteorite—perhaps as big as the one that struck Siberia in 1908 and leveled trees 20 miles away. A few similar observations are on record.

But the most interesting thing about them is their extreme rarity. For if the moon had no atmosphere at all, it has been calculated, the flash of a 10-pound meteorite's impact would be visible from earth with the naked eye, and about 100 such flashes would be seen yearly. Since we don't, is the moon totally "airless"?

That the moon can have no more than a trace of atmosphere is evident from the usual absence of a lunar twilight (rare exceptions have been reported) and the lack of refraction or light-bending when the moon's edge obscures a star. But an atmosphere 1/10,000 as dense as the earth's, at surface level, could escape

[Continued on page 270]

Next Month: Timetable to the Moon

When will we get there? How? What will we do there? Why? Scientists already have it worked out, step by step. May POPULAR SCIENCE will bring you the full story: an authoritative advance report on our schedule for exploring the moon, by Dr. I. M. Levitt, director of the Fels Planetarium at Philadelphia's Franklin Institute.

Now ad men have a new way to persuade you. They can pop a suggestion into your mind, using TV or movies, without your knowing it

TV's New Trick: Hidden Commercials

By Wesley S. Griswold

PROBABLY you've heard about—perhaps even worried about—a revolutionary new way to beam messages into the human mind. Especially suited to TV and movies, the new idea-injecting technique is said to work while you, all unawares, are innocently enjoying the program. The idea-words appear superimposed on the picture images too fast and too dimly to be seen in the normal way. Yet they register on your mind.

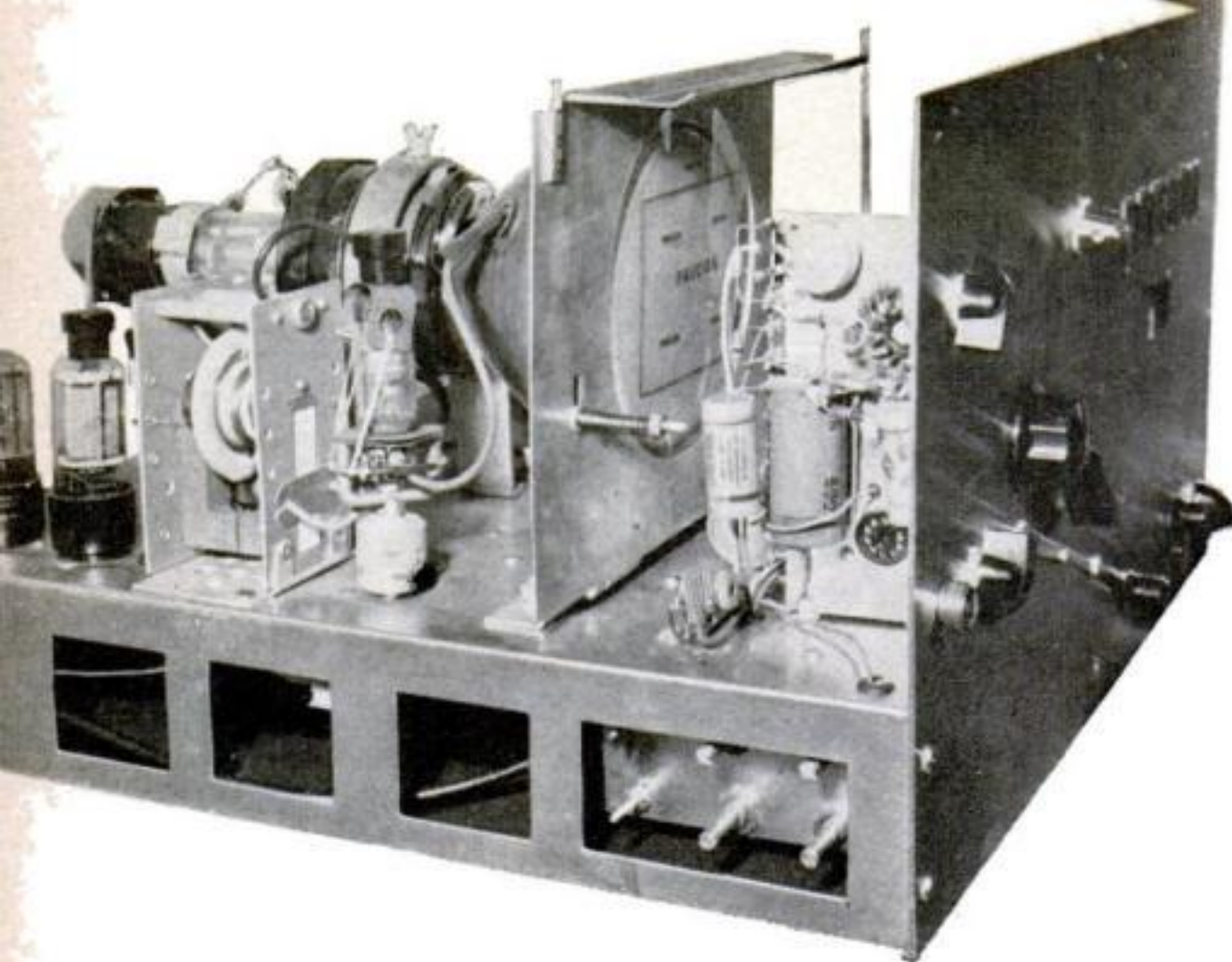
Despite rejection by the national networks, uneasy skepticism by the F.C.C. and alarm from people who fear that this strange development may bring wholesale invasion of privacy and risk of political tyranny, two means of reaching people's subconscious minds by television are currently being tested.

This month one of them, called Precon TV, was scheduled to be tried out on a large audience of TV watchers in and around Los Angeles. It was to have been Precon TV's first big showing. Its rival, Subliminal Projection, about which almost no technical details have been released, has already ventured on the air in Bangor, Me., and on a Canadian national hookup. Results for Subliminal Projection: inconclusive.

For its debut on independent Station KTLA, Precon TV did not plan to use advertising. Instead, public-service messages—like "Drive Safely," "Support Your Community Chest," or "Don't Be a Litterbug"—were to be tucked away into the telecast picture. But after this plan was announced, so much public criticism of the new technique boiled up that the trial was postponed. Controversy over these idea-injecting systems has swirled around three issues: (1) Are they legally proper? (2) Are they ethically acceptable? (3) And do they really work at all?

PRECON TV has a long history behind it. (The trade name comes from the word "preconscious," meaning "below the level of conscious awareness." "Subliminal"





HOW IT WORKS: The heart of Precon TV is a little flying-spot scanner and a frame holding a three-by-four-inch text. Pictures of the message are made with a rapidly pulsing light and intermixed with the regular video signals at a different rate per second. The aim: a message that the viewer doesn't realize he sees—he "feels" the message instead.

means the same thing.) Its inventors, Dr. Robert E. Corrigan of Los Angeles and Prof. Hal C. Becker of New Orleans, both men now in their mid-thirties, have been testing the theories and working parts of Precon for the past eight years. Patents were applied for early in 1955, but have not yet been issued. Consequently, the inventors decline to tell everything about their creation, though they have revealed the essentials.

The basic equipment, the means of sprinkling television programs with invisible but receivable messages, is contained in a rectangular metal box about half the size of a standard table-top TV set. Its power unit, in a separate, much smaller container, runs on house current.

This equipment is a kind of electronic mixing bowl, where printed information can be subtly stirred in with pictures. Inside the main Precon TV cabinet, along with 17 vacuum tubes and a photo multiplier, is a little flying-spot scanner and, in front of its round face, a small frame for holding the text to be scanned. The text is printed on a transparent plastic slide, on a three-by-four-inch space.

Picture signals from image-orthicon tubes in studio cameras focused on live performances, or from iconoscopes recording filmed scenes, are piped into the Precon TV apparatus on their way to the station's antenna. To understand what happens to them in the Precon blender, remember that it takes one-thirtieth of a second for a cathode-ray tube to project one complete picture image on a televi-

sion screen. In that time it has to scan the picture twice, each perusal taking one-sixtieth of a second.

IN **INSIDE** the Precon TV cabinet, with the aid of the pulsed light emitted by the flying-spot scanner, the printed message is superimposed on the incoming picture signals *every other* one-sixtieth of a second. (The rate of mixture can be varied, as can the intensity of the pulsed light, which normally is less than one-third as bright as that of the picture signals.) The well-mixed video brew then flows on to the station's antenna, to which the program's sound signals, not involved in Precon TV, proceed independently.

Prof. Becker, an electronics engineer and physicist who teaches experimental neurology at Tulane University, points out a fascinating quirk: When you suspect you're watching a Precon program, you can find out what the hidden message is by spreading the fingers of one hand and moving them rapidly up and down in front of your eyes. By varying the rate of this movement, you'll soon find and match the rate at which the Precon message is being pulsed. Then you'll be able to read it.

"THE two questions we are most often asked about Precon," said Dr. Corrigan, a former fighter pilot who is now a psychologist for the Douglas Aircraft Co., "are 'How do you know that it works?' and 'Is it dangerous?'"

"We have found ample proof that it works," he continued, "in exhaustive experiments at Tulane University that we have been conducting since 1950. In the course of finding that proof, we also became convinced that the Precon technique of communication can't be dangerous. There is no possibility of brainwashing by means of Precon, for each man is his own censor. His preconscious mind responds to Precon messages in complete accord with his likes and dislikes. There is no better chance of putting something over on his preconscious mind than there is of hoodwinking his conscious mind."

Corrigan and Becker discovered people's built-in censorship in tests in which three different types of words were very rapidly projected on a screen. Some of the words were neutral—like "stove," "table" and "rug." Some had emotional impact—"scream," "blood," "hate." Others were obscene words.

In repeated trials, the speed at which each word was flashed on the screen was slowed until the person being tested could say that he definitely had seen it. The researchers found that the emotional and obscene words had to be shown two or three times slower than the neutral words before people watching the screen could recognize them. Corrigan and Becker took this as firm evidence that the people were resisting and censoring upsetting words.

Next, in addition to calling out when they could identify a word, the subjects were asked to press a little lever as well. It was then discovered that not only did

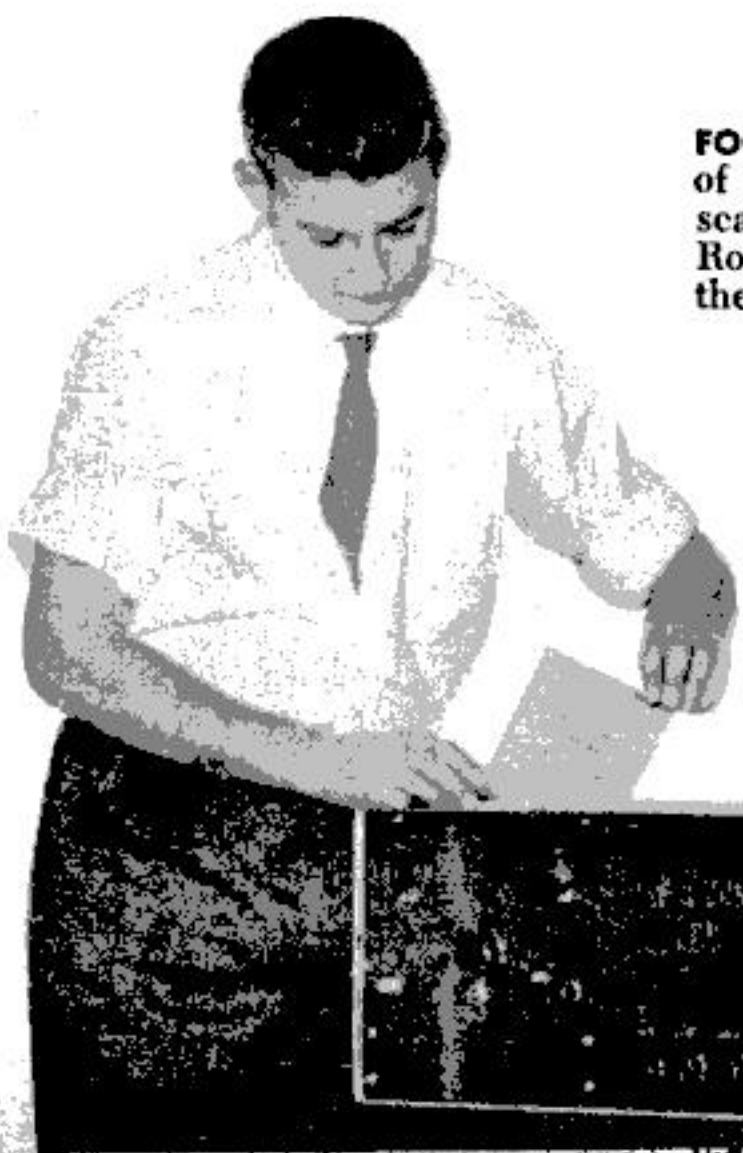
they push the lever sooner than they reported seeing the word—thus proving preconscious perception—but they reacted preconsciously to emotional and obscene words precisely as they did when conscious of them. They were censoring them without being aware of it.

FURTHER tests showed, they contend, that people can be taught preconsciously. Corrigan and Becker arranged to give their subjects tiny electric shocks whenever certain neutral words were flashed on the screen. Then the shocks were stopped, but when the words that had been associated with them appeared again, the subjects reacted to them preconsciously as if they were words highly charged with emotion. They had learned, without realizing it, to attribute a new and painful meaning to harmless words.

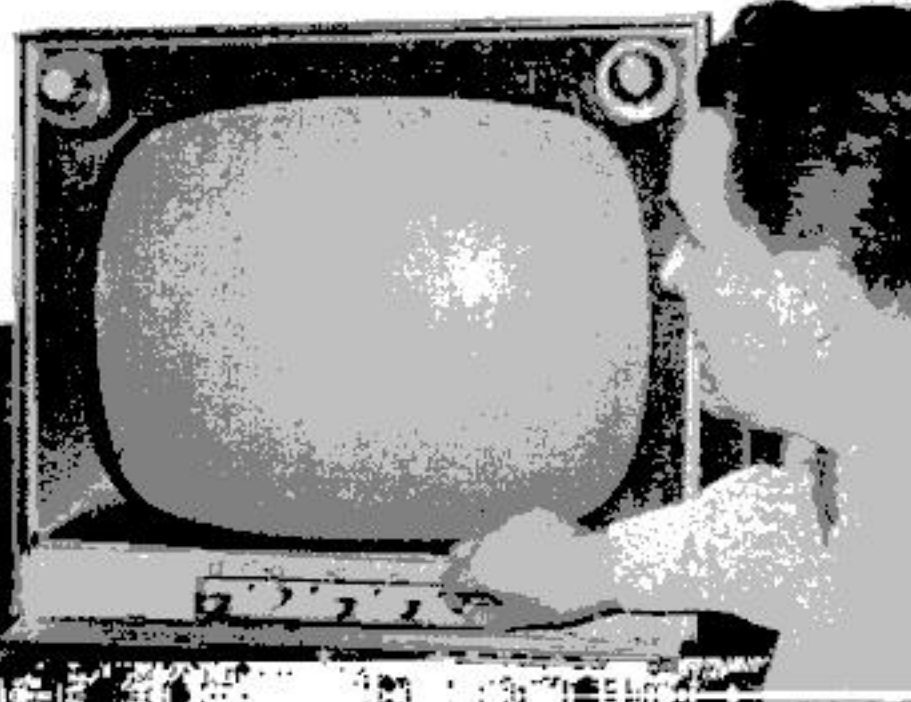
The Precon developers gave groups of people jumbled letters to rearrange into actual words. Before the test began, they showed the answers on a screen, too fast for anyone in the room to see. Preconsciously they were seen, however, and comparative tests indicated that the subjects solved the puzzles 15 to 46 per cent faster when the answers had been slipped to their subconscious minds in advance.

Finally, Corrigan and Becker expanded their experiments to theater-size audiences. They showed movies—color cartoons—in which printed information was hidden from conscious view. In one case, geometric symbols—a triangle, a circle

[Continued on page 252]



FOOD FOR THOUGHT: An advertising slogan on a small strip of transparent plastic is being fed into the Precon picture scanner by Prof. Hal C. Becker as the co-inventor, Dr. Robert E. Corrigan, watches. Lighted at one-third normal, the words are "buried" in the regular TV picture.



Talking Prowl Car Warns Wayward Drivers

TRAFFIC cops in at least four states, so far, are enthusiastically using a new safety device that fills the wide gap between a dirty look and a summons. It's a powerful public-address outfit installed in a car. Mobile p.a. systems are nothing new; but this one, called the Electro-Talker, has a built-in tape recorder that can broadcast the same 15-second message over and over.

Already some 35 "talking cars" are on the road. State, county and city police

departments operate most of them. Maine has some, and so do Fredericksburg, Va., Detroit, Montreal, Poughkeepsie and Nassau County, L. I. But you'll also find such cars driven by the New York City Fire Department, the Vermont Department of Forests and Parks, Pennsylvania civil-defense units, and the Arabian-American Oil Co. overseas. The makers of Electro-Talker, the Municipal Street Sign Co. of Brooklyn, put 18 months into the development of the original model.

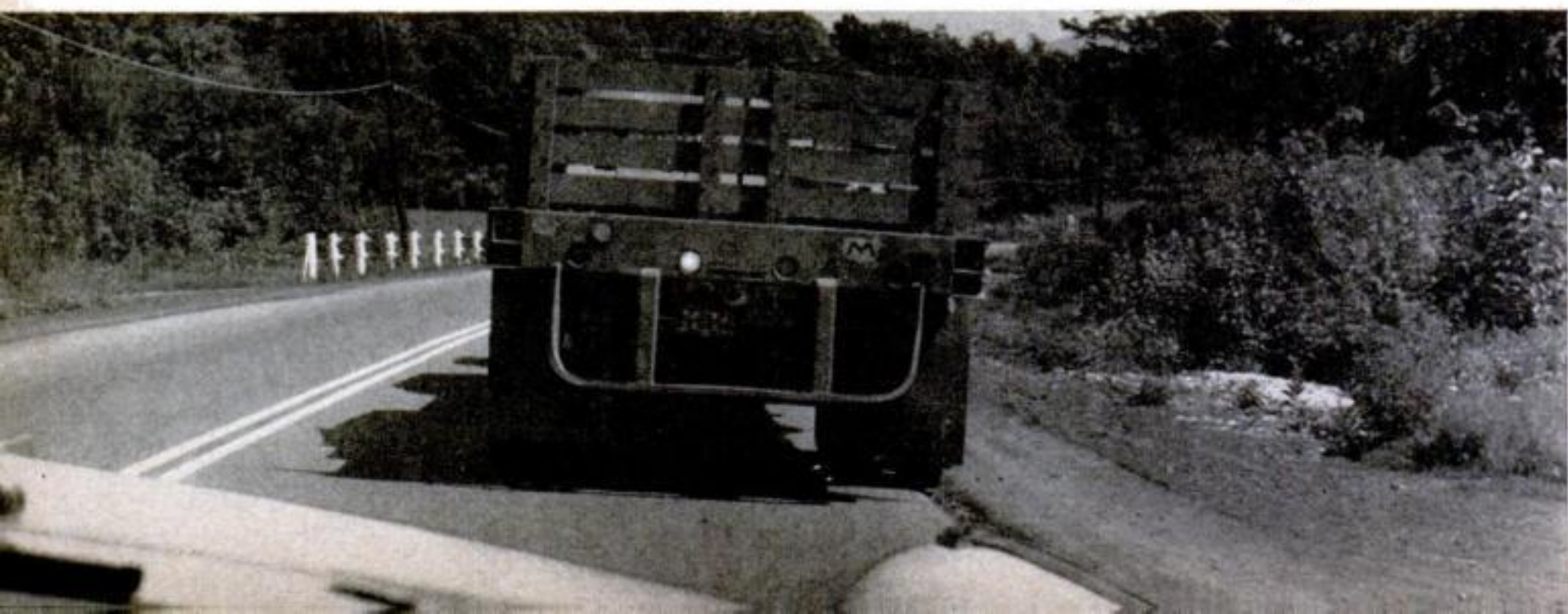


*"You're too close for this
speed—pass or drop back"*

When this driver got the message, he hesitated, then pulled out and passed. The rear-fender speaker proved the most effective; it could be heard best and, because motorists could see it, they weren't startled.

*"Thank you . . .
Thanks very much"*

This truck pulled over to let us pass safely as it crept up a long hill. When we drew ahead, Dr. Toth switched on the rear speaker and expressed his appreciation. The amazed truck driver waved and grinned.



One of Municipal's best unpaid salesmen is the training car of New York University's Center for Safety Education. As a free service, Dr. William Toth tours the country, training police and safety officials in the use of highway safety devices like radar. Roadside speeches to large groups strain the vocal chords so when the Ford Motor Co. donated another car to the Center not long ago, the safety men had an Electro-Talker installed in it. Dr. Toth soon found himself spending more time demonstrating the Talker itself as a safety device than using it for speeches.

Recently I rode in the NYU "talking car" from New York to Cumberland, Md., where state safety officials were meeting. The photos tell the story of that trip.—*Edward D. Fales Jr.*



HEART OF ELECTRO-TALKER consists of this tape recorder and amplifier. A converter in the trunk supplies 110 volts from the car battery. There are three speakers: one behind the front grille, one on a rear fender, one that's portable. Holding mike is Dr. William Toth of NYU.

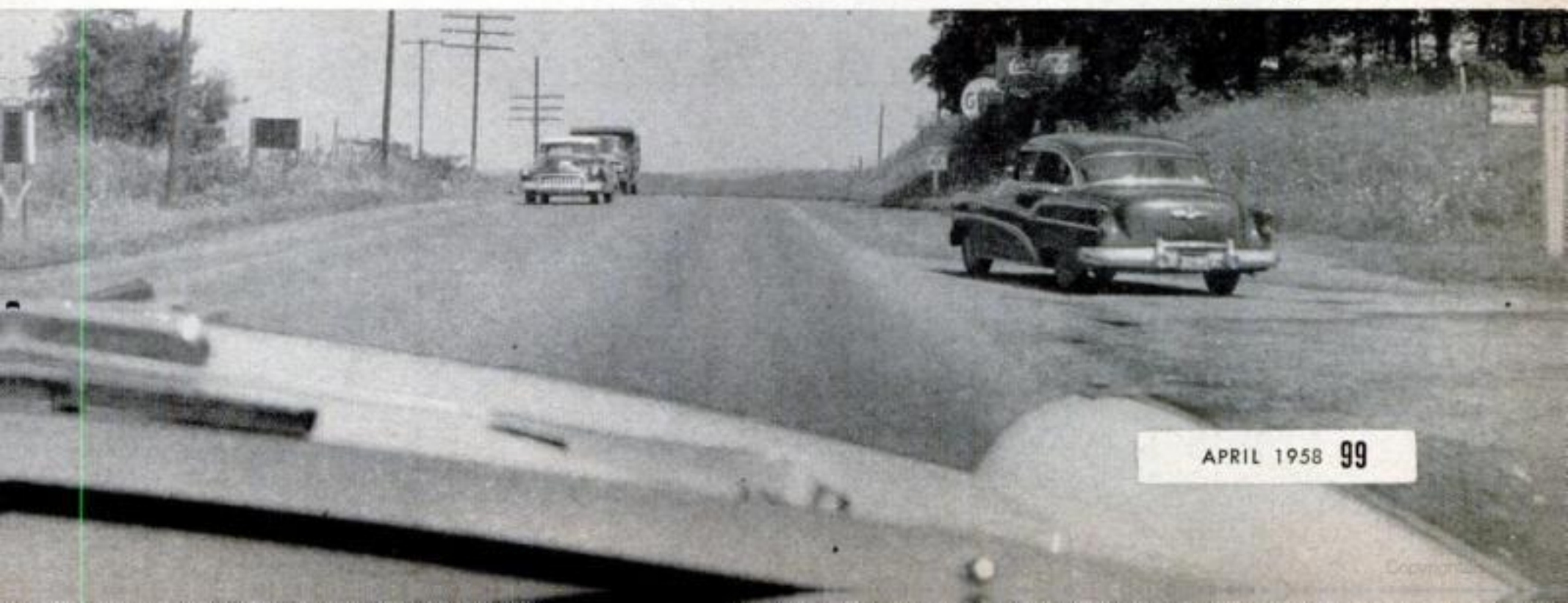


*"Your right front tire
is getting soft"*

Heading south on the Jersey Turnpike, we tried to warn a driver ahead, but in the rain our front speaker failed to penetrate his closed windows. We passed him and switched on the rear speaker. He pulled off.

*Bong . . . Bong . . .
Bong . . . Bong*

We were doing 50 when a car threatened to pull in from a side road. We gave him the gong (a recording of the mellow notes of an old dinner bell). He stopped. A horn might have irritated him into going ahead. ➤



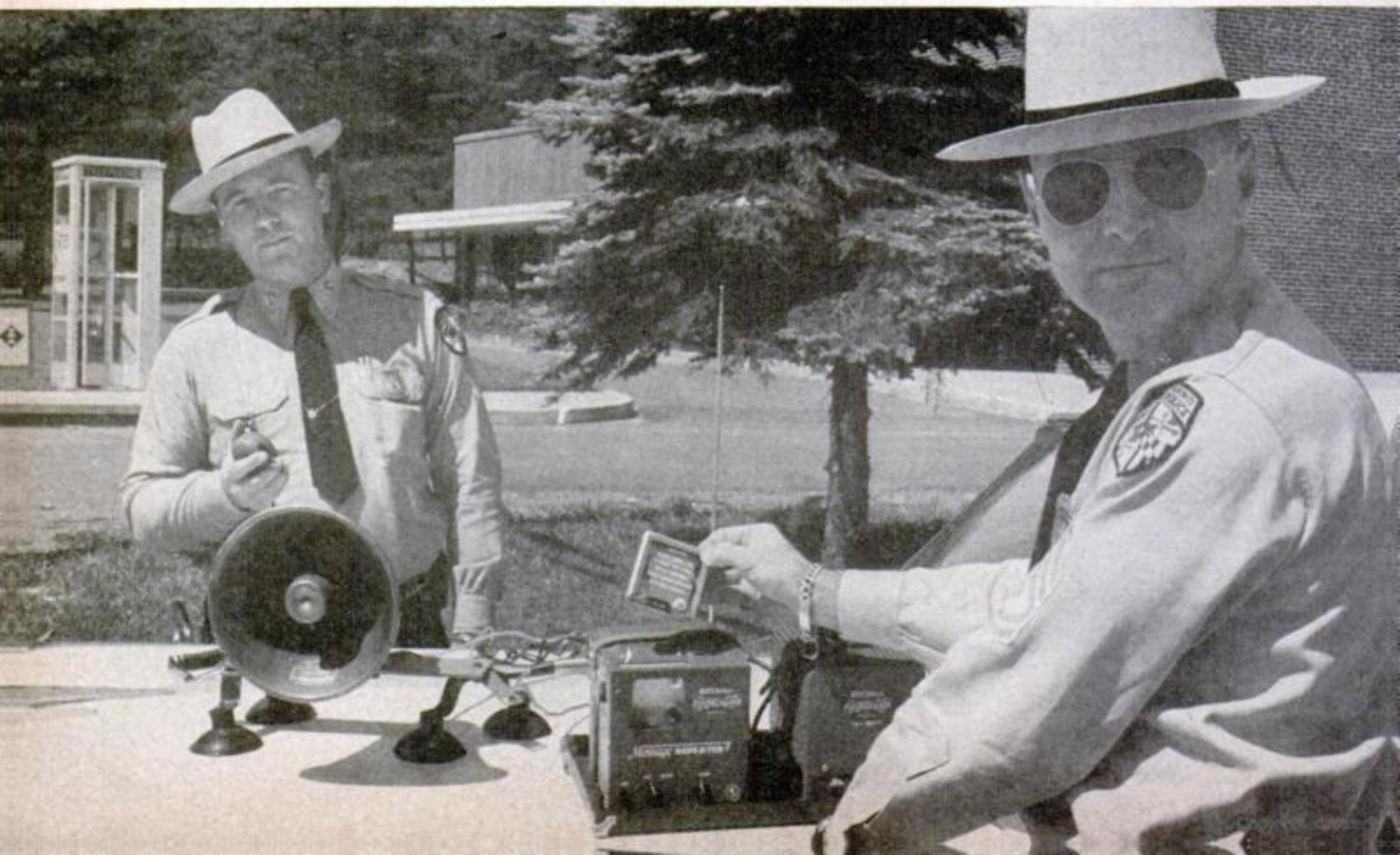


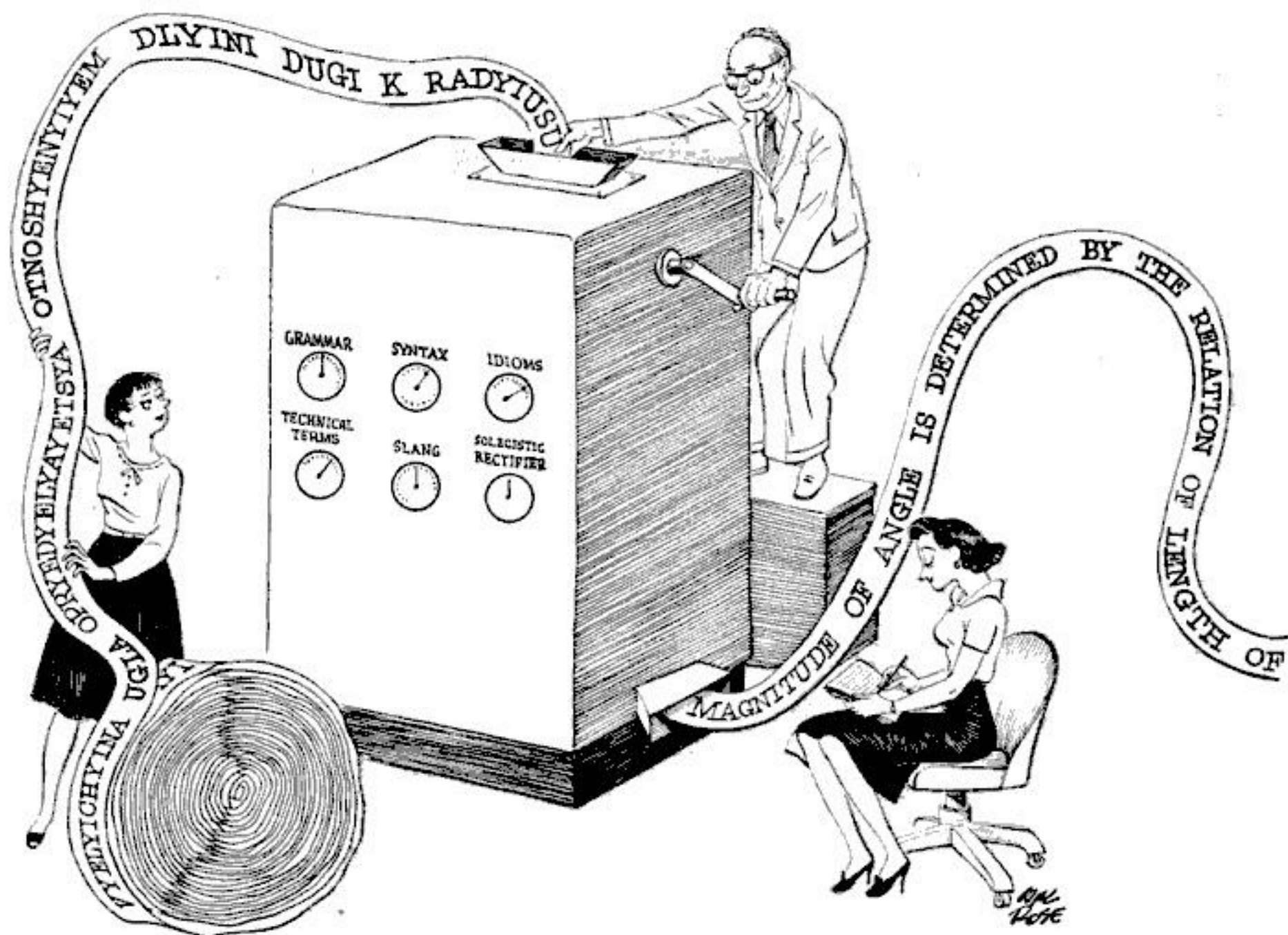
*"Slow down, slow down
—accident ahead"*

*"Take it easy . . . This is
a 30-mile zone"*

Motorists are cautioned near Cumberland, Md., as safety officials test the equipment under actual highway conditions. Here portable speaker sits atop hood alongside control units. Full-volume range is a mile.

State police drop a 15-second recording into the message repeater. Officer in background can cut in with his mike whenever he spots a driver who rates a little personal attention from the constabulary.





Breaking the Language Barrier

Each year, millions of reports on scientific research are published—a big fraction of them in foreign languages. In this mass of Russian, Dutch, Chinese, Hindustani data are clues to H-power, interplanetary flight, more powerful batteries, longer-wearing tires. The trouble is: Too few scientists and engineers read foreign languages. What we need is a machine to read one language and type in another: an automatic translator. We're trying to build—not one, but several. Engineering problems? Fantastic. Here's where we stand now.

By Hartley Howe

THE girl sat at the keyboard and punched onto cards the words on the sheet before her. *Vyelyichyina ugla opryedyelyayetsya*, she banged out, *otnoshyenyiyem dlyini dugi k radiusu* . . . Red lights flashed on and off across

a central control panel as the cards were fed into a big IBM computer. There was a moment of suspense, finally broken by the chattering of the automatic printer. "Magnitude of angle," it spelled across the page, "is determined by the relation of length of . . ."

The machine was "translating" the

Word order is tricky: "Lion kills man" and "man kills lion"

Russian sentences into English—automatically printing 2½ lines a second.

It was only a demonstration. The Russian texts were preselected by the experts who programed the computer; the vocabulary was tiny and the sentences simple. But Georgetown University's translating computer was a portent of things to come. Today, scientists in several countries—particularly the United States, Great Britain and Russia—are working out the theory behind machines that may break down the language barriers between nations.

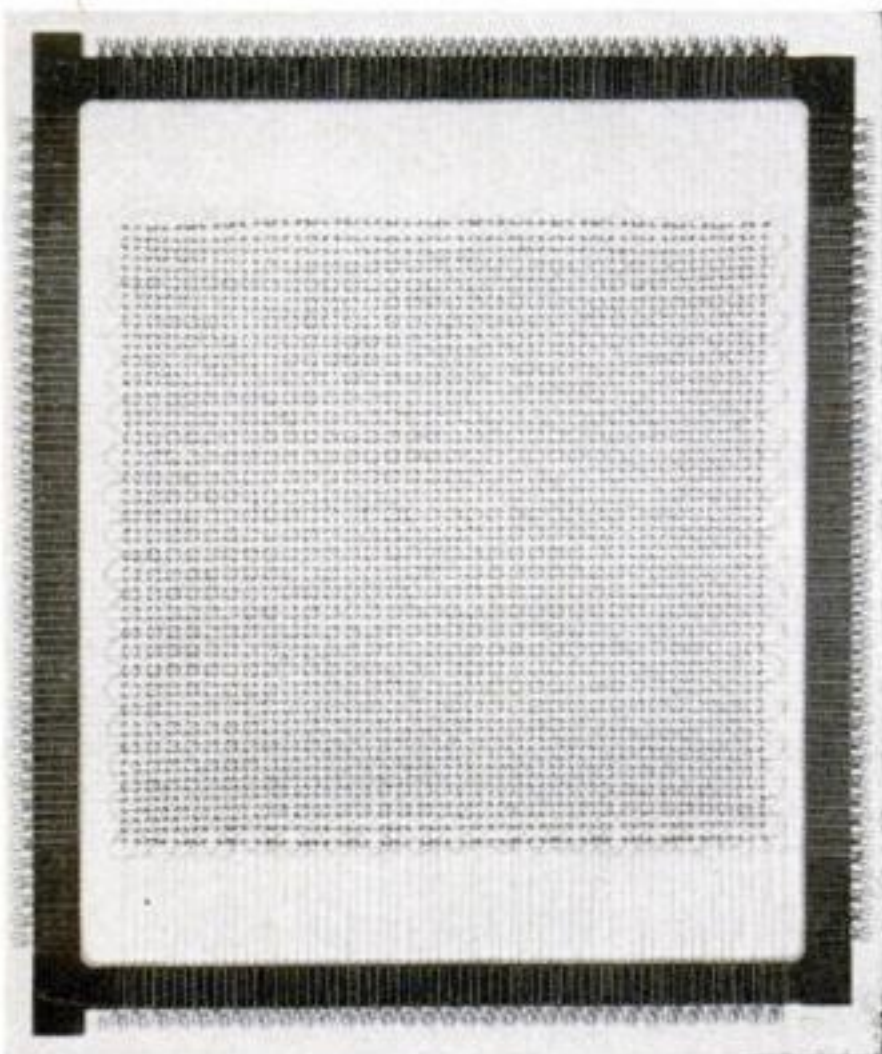
THE urgent need is for quick, working translations of technical research reports and scientific papers. The linguists and mathematicians don't expect their machines—once they get them—to translate poetry or plays or novels. Literary shades of meaning will be too delicate for even the most complicated machine.

In technology, it's a different story. Today scientists can't keep up with progress in their fields in other countries. Sometimes they are held up by problems that have been solved elsewhere. An example:

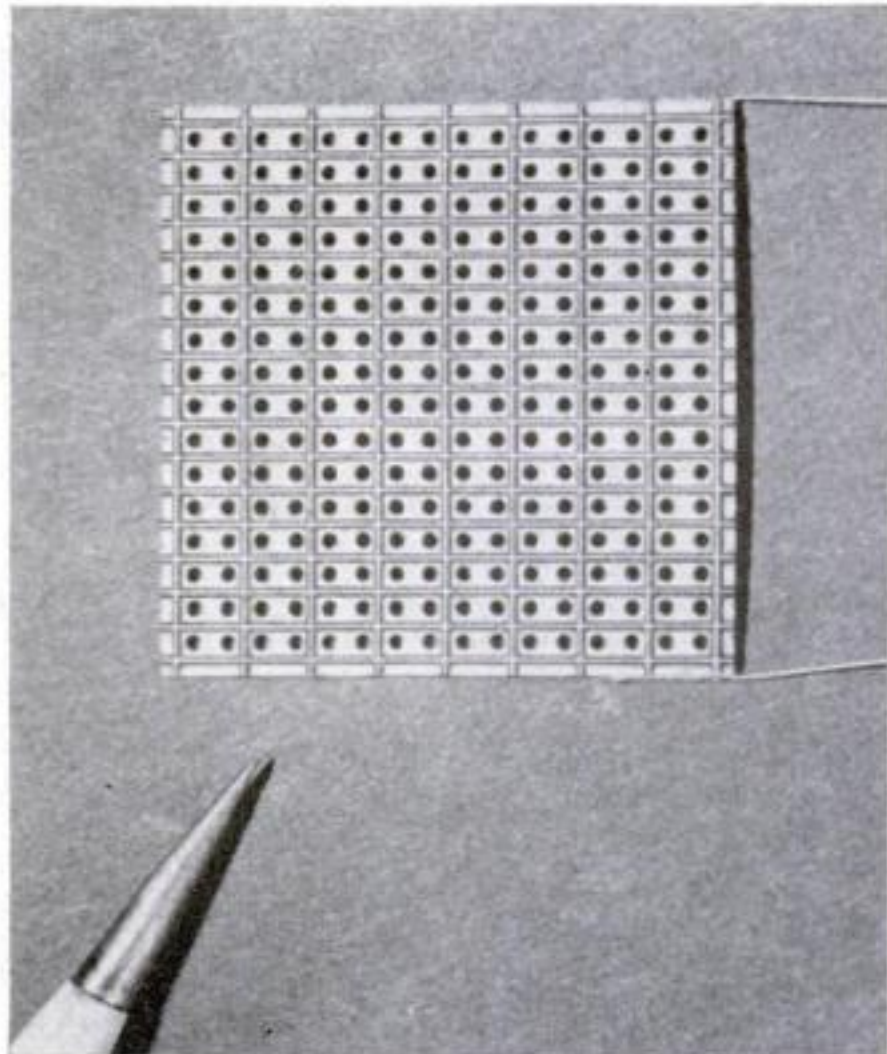
A paper on electric switching networks published in Russian was overlooked by Americans who needed it *for five years* while American scientists painfully duplicated much of the work, at an estimated unnecessary cost of \$200,000. As for the Soviet moons: The truth is that American scientists worked frantically to tune in on their signals—only to find later that they could have learned the exact frequencies months beforehand from articles in a Soviet amateur-radio magazine that we had, but didn't get around to translating.

RUSSIA does it differently: An army of linguists abstracts into Russian some 400,000 articles on engineering and science every year, as well as making full translations on request. Right now, the United States can't come near matching that setup. Even if we double the number of Russian scientific journals that are translated or abstracted, which is the plan for 1958, it won't begin to serve. Our scientists will be getting a look at fewer than half of those that they themselves rate as "significant for research." And this doubled number of translated

Here are two types of electronic "memories"



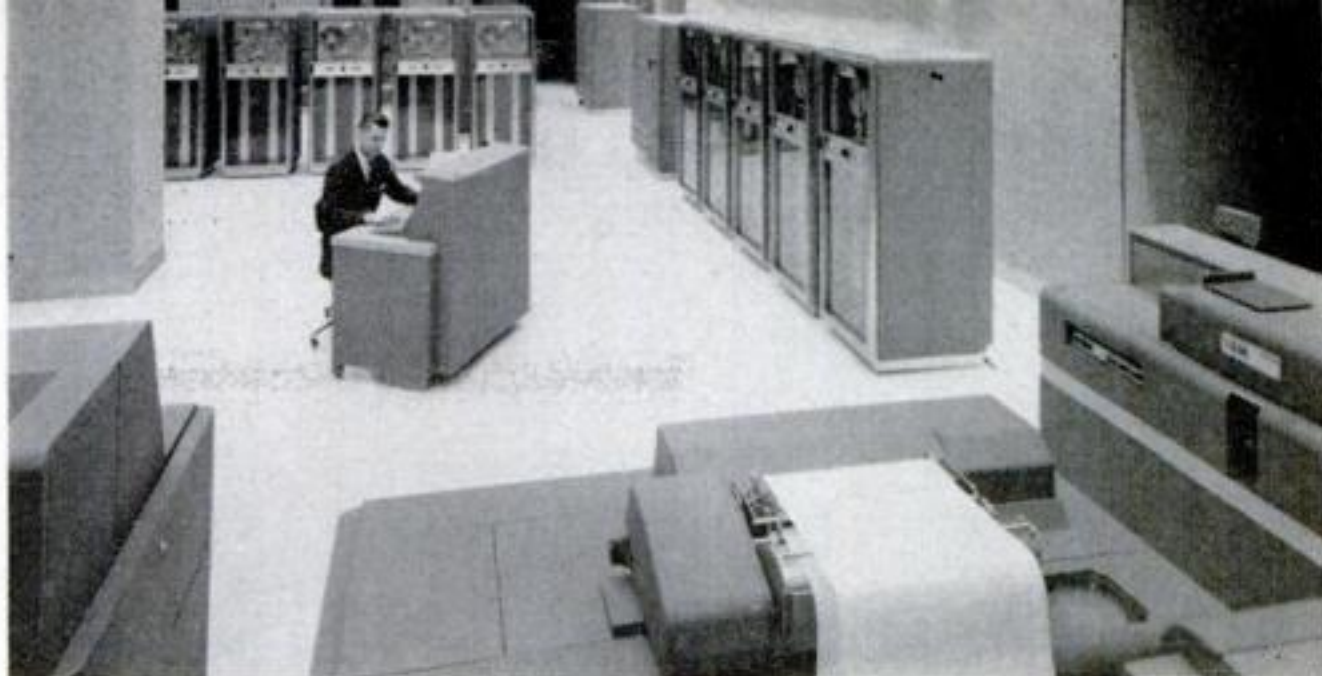
SMALL HEART of IBM's immense electronic computer is this plane of ferrite cores. The urgent question: Will we be able to "teach" magnetic cores like this to store away a language?



TINY PERFORATED PLATES (note pencil point) are used in RCA's memory machine. RCA says enough of these plates to fill a shoe box could recall a million bits of information.

aren't the same

TEAMWORK: Human brain controls roomful of elements in an electronic brain, IBM's 705. Tape units feed problems—some day, foreign words?—into a computing system. It needs only split seconds to weigh choices and pick the right answer.



journals will still include only one in 12 of all Russian scientific journals.

Worse, it's not just a matter of mining Russian journals. Experts say valuable material is to be found in at least 50 languages, and that there are people speaking at least 200 different languages who could use information now locked away in other tongues. Even if human translation weren't slow and expensive, for many languages besides Russian there's a frightening scarcity of trained linguists. We're trying to train them—but over the long haul, the best answer now in sight is a partnership of human translators and machines.

IT WAS World War II use of computers for a special kind of translation—devising and breaking secret codes—that led scientists to consider the possibility of a mechanical translator. For theoretically there's no reason why computers shouldn't do three things as well as—or better than—any human translator:

- Remember as much language as their builders teach them.
- Locate the words fast.
- Deliver all their stored learning—translated.

How would a translating computer actually work? First step would be to fill the computer's storage system or "memory" with a two-language dictionary—words in the "input" language and their equivalents in the "output" language, all stored in code.

In translating, each input word would be fed into the computer, which would search its coded memory for the same word. The computer then would "read"—pick out—the equivalent in the output language, decode it, and print it by teletypewriter. A simple dictionary of this sort, capable of translating a few German

words into English, has been built at the University of Washington.

To see a simplified version of this operation, put a dime in a jukebox. You choose a title; that's the input word. The machine searches for the title and pulls out the corresponding record. Then the machine plays the record and you hear the output in a new language: music.

But with mechanical translators, there are these complications:

- A single word can have several forms. In Russian, for example, one stem word may have 29 different endings. Somehow, the machine must recognize the various forms of the basic word.

- A word can have several meanings. In English, the word "run," for instance, can mean 54 different things. The computer must pick the one right meaning.

- Word order is sometimes quite different in other languages. Think of the confusion if "man kills lion" were translated "lion kills man."

- Certain words in some languages don't exist in others. Russian, for example, has no words for "the" or "a." These words are vital in English: "give a man air," "give a man an air" and "give a man the air" are quite different.

Combining a machine with a human editor—who would need to know only one language—might solve some problems. The machine would print all possible meanings of doubtful words and an editor would choose the most likely one. Or an editor might go over the input copy in advance to adapt it for straight word-for-word translation.

BUT most experts believe that the best answer is to build a machine that can match everything a human translator does. Solving the multiple-ending problems would be the easiest. A machine can

be designed to separate word bases from endings, find their individual meanings, and put the two together for the correct translations.

A harder problem is to select the one right meaning of a word. But progress is being made. Research has shown that you usually understand a word's meaning in a sentence because you understand the words on either side of it. The Georgetown-IBM translating computer worked on this principle. When a direct translation was impossible, the computer cross-checked the adjacent words. The Russian word "o," for example, can mean either "about" or "of." When the machine came to "o," it was directed to check a code sign attached to the preceding word. If the code sign was 241, "o" was translated "about." If code sign 242 was found, the machine used the second English meaning—"of."

At the University of Michigan, where scientists at the Engineering Research Institute are working on a Russian-translation system, the approach is different. The method is statistical—based partly on the frequency of words in a language—as opposed to a literal linguistic approach. Yet so far the experimenters see no reason—again, in theory—why such a method couldn't eventually be used to "train" a computer to produce 90-to-95-percent-accurate translations.

Is 95-percent accuracy enough? That's the standard also achieved by some other ways of using context that have been worked out. But some experts argue that 95 percent *isn't* good enough. The most significant words in a sentence are likely to be the other five percent. In the long run, they believe, it will be quicker to learn more about the structure of language than we know now. We still have only a human's-eye view of the languages we use. We must take a new look at grammar and structure from the machine's point of view—figure out the patterns in the world's languages in order to teach them to a computer and make a translator out of it.

Once the structural pattern of two languages has been worked out, their various elements can be matched, and the machine programmed to build equivalent sentences in the output language from scratch. At Massachusetts Institute of Technology, a team of four linguists and

a physicist are making such a study of German. Not surprisingly, they see five to 20 years' work ahead.

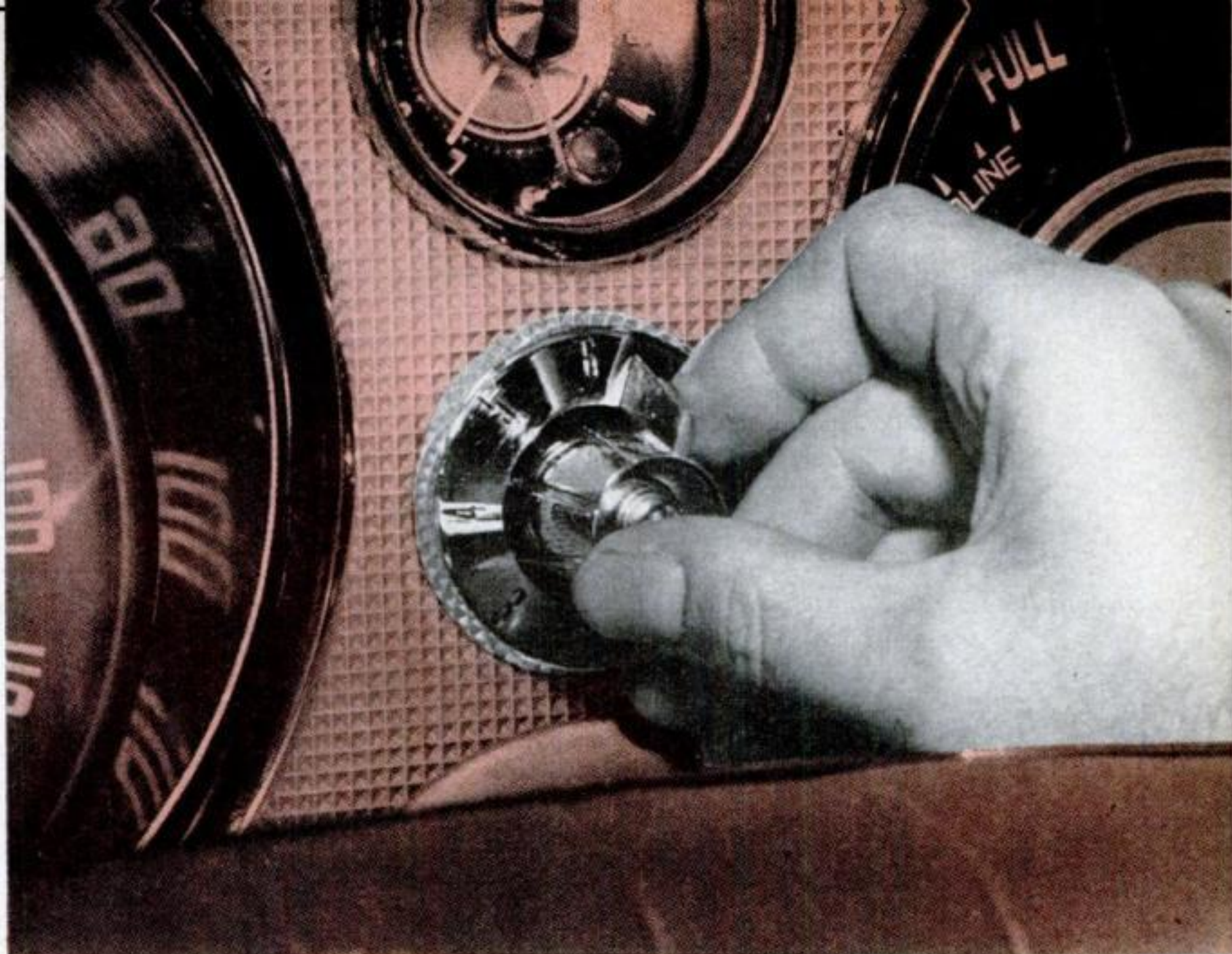
Can we avoid the enormous job of pairing all important languages in this way? Yes, by developing a "master" language—either an existing one, such as English, or a new, artificial language—to which every other language system can be matched. Translations would have to be done twice—input to master, master to output—but much less basic research would be needed.

MEANWHILE there are still plenty of straightforward engineering problems for the experts to solve. One is speeding up input. At present, the input text must be copied on punch cards or tape—a real drawback when the computer rents for \$30,000 a month. Some computers, however—developed to handle checks in banks—can already "read" numerals printed in special magnetic ink, and adaptation to letters is already under way. Next step will be a photoelectric scanner that can read ordinary printing—it might be hard to persuade foreigners to use magnetic ink just to please our machines.

Still further in the future are translators that will pick up a spoken statement and turn out a printed text in another language. This will require teaming a computer with a machine that will transform sounds into written symbols—an electronic stenographer. Bell Laboratory's AUDREY (Automatic Digit Recognizer) can already identify the spoken numbers from "zero" to "nine"—but only if a man says them in a clear voice. The problems are staggering because human voices and accents vary enormously. A machine that recognizes that a Georgia cracker and a British duke speak the same tongue will be a triumph of electronics.

This kind of problem isn't limited to spoken language, of course. The meaning of any sentence depends not only on the actual words but on who wrote or spoke them, when, where, why. Not until the experts figure out some way to feed this information to their machines will they have the equal of a really good human translator—the scholar who knows that a good translation of *Que sera sera* might well be "That's the way the cookie crumbles."

END



You simply dial the speed you want the car to maintain, using this instrument-panel knob.



What It's Like to Drive an Auto-Pilot Car

Like it or not, the robots are slowly taking over a driver's chores. The newest one is a power-operated accelerator pedal

THE automatic auto, an intriguing if faintly ominous concept, came closer this year when the Chrysler Corporation unveiled an optional supergadget for its swanky Imperials and Chryslers. Called an "Auto-Pilot" and tabbed at about \$86 extra, it is a development of a device first described in *POPULAR SCIENCE* several years ago ("Educated Gas Pedal Keeps the Cops Away," Jan. '54).

Actually, the device is a power-operated accelerator pedal. This fact alone has been enough to distress some car critics, who argue that drivers are being increasingly engineered out of a decent sense of participation in the new cars. The Auto-



SNUGGLED on the 1958 Imperial between a vacuum tank and the power brake, the Auto-Pilot fits on the left side of the engine compartment. Its motor runs only intermittently.

You become increasingly aware of the sensitive tasks

Pilot has also hoisted the eyebrows of a few safety experts. Here the contention has been that, with literally nothing to do except steer and ruminate, a driver may fall victim to hypnotic goof-offs.

Such judgments appear to be academic. This writer recently made a 4,000-mile cross-country run in an Auto-Pilot car, and ended up with these conclusions:

- It is a real comfort on a hard run.
- For psychological reasons, it is not an incitement to dozing.
- It can be used on many, but by no means all, intercity roads; and
- It gives some fascinating insights into unconscious driving habits.

What it is. On the instrument panel there's a pushbutton and a knob that can be turned to calibrations from 30 to 80. Under the hood there's a shiny hunk of mechanism, smaller than a breadbox, that houses a reversible electric motor, a flyball governor, and associated electrical gadgetry. A flexible shaft resembling a speedometer cable feeds in car-speed information; a rod leading to the carburetor linkage executes commands to the throttle.

What it does. This is not easy to explain to women and the mechanically innocent. Not that the gadget is particularly complex; it's just that it offers two different though related services. In function No. 1 it is a speed minder—a mechanical conscience that urges you, by increased accelerator resistance, to stay under the speed it is set at. It doesn't actually prevent you from speeding, though; you can (while passing, say) readily tromp past the increased resistance.

In function No. 2 the device is a speed maintainer. Its motor depresses or releases the accelerator as needed to hold the set speed up hill or down, whether your foot is on the gas or not. You bring the car up to the speed the knob is set for and then touch the latching button. The car then eerily continues at that speed until it runs out of gas—or until you touch the brake pedal. This instantly unlatches it, returning you to conventional operation. In effect it is a robot that constantly compares an ideal speed (the knob setting) with the car's actual speed. Whenever the two begin to differ, the throttle is corrected and the speeds recompared.

Its best is very good. On the 60-m.p.h. New Jersey turnpike the Auto-Pilot showed off theatrically; it managed the throttle for 76 miles in an elapsed time of 76 minutes and 13 seconds. Even that 13-second error—less than half of one percent—wasn't really the gadget's fault. Once it had to be unlatched for a moment because of a bind in traffic, and another time for a brief debate on the tactfulness of overtaking a police car.

In hilly country, as in much of West Virginia, this remarkable precision falls off. Average speed still is close to the set one, because hill effects are usually transient, and tend to cancel. But temporary variations of three or four m.p.h. above and below the setting aren't uncommon.

The reason lies, of course, in the limitations of the throttle as a speed corrective. Downhill, the most the little robot can do is take its electromechanical foot completely off the accelerator. If the grade is so steep that that isn't enough, the car necessarily goes faster.

Uphill, the situation is slightly different. Chrysler's big engine has ample moxie to hold speed on any normal highway grade, given a moment or two to roll up its sleeves. The trouble is that the Auto-Pilot doesn't know a hill is coming. It gets word only on how fast the car is going *now*; there's no anticipation. So the robot acts only when the upgrade has already begun to slow the car. It feeds a little more gas; and when in the case of a sudden hill that isn't enough, it piles on more and more power. Soon the big

.....

• **How electric motor**
• **controls gas-pedal position**
•

THE actual mechanism of the Auto-Pilot is both more compact and more complex than this simplified diagram suggests. Automatic control is as follows:

1. The desired speed is set by the speed-adjustment knob. This changes the force exerted by the governor spring.
2. At dialed speed, the latching button is pressed. An electromagnet draws down a latch that rigidly joins two control arms. One arm is positioned by a reversible motor and the other is linked to the throttle.

.....

your right foot has been performing all these years

engine is laying into it potently and the speed comes back up.

Your clever foot. Driving a few thousand miles with this robot will give you increased awareness of the sensitive, constantly corrected tasks that your right foot has been performing all these years. The most obvious one is this attack on a hill. Quite automatically, an experienced driver's accelerator foot feeds a little extra speed at the approach of a hill. Even if you don't actually crack on a few extra miles an hour (which you usually do), that foot is alerted to press down at a quickly increased rate the moment the hill load comes on the engine.

Topping a rise. A more subtle example of delicate human throttle handling comes at the top of a hill. In South Carolina we noticed that, as you go up and over a fairly steep rise with the robot locked on, there is a strong impression of something slightly wrong. The Auto-Pilot seems to feed more gas as you near the top; you seem to crest the hill going faster than on the middle slope.

This is an illusion, as the speedometer reveals. At first it is a puzzler: The robot is clearly whisking you over the top, but the needle shows no (or almost no) overshoot. Then it dawns on you: It feels slightly wrong because it's not the way you drive yourself. Just as the Auto-Pilot didn't know a grade was coming, now it doesn't know that near the top of a hill there is a point where your sight distance shortens rapidly. Managing the accelerator yourself, you automatically feather

back, throwing away a little speed to compensate for the reduced distance you can see. The robot, knowing nothing of this, simply whisks the car up and over at a constant rate.

This hilltop quirk of the Auto-Pilot (more accurately, of sight geometry) doesn't amount to a hazard of consequence. If the hill-cresting threatens to become too brisk, you simply tap the brake and unlatch, or else just back off the speed knob.

Around the bend. On a cross-country run you inevitably notice how state highway departments compare, and particularly how they throw you their curves. On some roads the curves come up fair and square, keeping above a minimum and uniform radius of curvature. Others, though, are sneaky: They mix up their offerings deceptively, tossing in an occasional spitter that tightens up wickedly.

The Auto-Pilot dramatizes these differences. It works fine on some curvy roads, mainly the newer and more lavishly designed ones. On others, though, like the secondary highways in Georgia and Alabama, it's more trouble than not, since you are incessantly unlatching. The problem is this: How big a spread is there between cruising speed for the curves and that for the straights? On a road where the 60-m.p.h. straights are irregularly interrupted by 30- or even 25-m.p.h. curves, you don't use the Auto-Pilot.

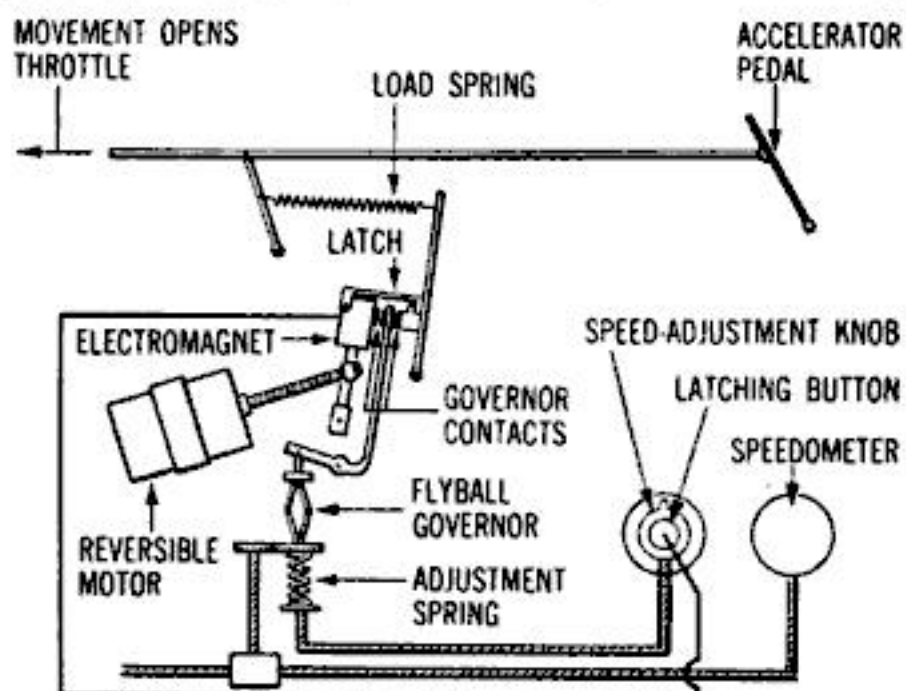
Those top speeds. Unexpectedly, you tend to drive a little slower with the Auto-

[Continued on page 248]

3. As car speed deviates from the set speed, contacts on a governor-controlled center lever touch one or the other arm. This energizes the motor in the direction that will move both arms to open or close the throttle. When car speed is corrected and stabilized, the governor contacts are centered.

For clarity, part of the throttle-opening linkage is omitted here, as is the circuit that unlatches the arms if the brake pedal is touched.

In its speed-warning function, the device operates with the latch "ajar." This does not open the throttle automatically, but does interpose extra spring loading on the accelerator above dialed speed.



New Radio Steals Its Power from the Air



Nearby station can furnish power . . . to receive a distant station

Invention of "telepower" will give broadcast waves striking new jobs to do

FOR the past three years a radio in the attic of a suburban Washington home has been driving a 12" loudspeaker 24 hours a day without using house current, batteries or solar

energy. It gets free power from the air waves.

There are two independent circuits in the receiver: one to pick up the signal you hear, the other to extract from the atmosphere the tiny amount of power required by the receiver's transistors. The power circuit captures some of the electrical energy coming from radio or TV broadcasting sta-

A TELEPOWER RECEIVER YOU CAN BUILD

HERE is a circuit to start you on your own experiments with telepower. It is designed for headphone operation on the broadcast band and gets its operating power from a local broadcast transmitter.

Circuit No. 1 on the diagram is the radio receiver using a crystal diode, D1, for the detector and a PNP transistor as an amplifier. The antenna is coupled to the tuning coil, L1, by three turns of insulated wire wound on the top end of the coil. This same wire continues to circuit No. 2, the telepower circuit, where it is coupled to a second tuning coil, L2, through a trimmer condenser, C2.

The diode, D2, rectifies the incoming radio-frequency energy, and the resulting DC is stored in condenser C3 which serves as the battery for the transistor amplifier in circuit No. 1.

When the receiver is wired, connect the antenna, ground and headphones. Antenna should be about 50 feet long, and high above the ground. Headphones should be magnetic type with at least 2,000-ohm impedance.

To adjust the receiver:

1. Temporarily connect 1½-volt flashlight battery across C3 with positive terminal to the ground.

2. Tune circuit No. 1 by turning the threaded shaft in L1 until the strongest station is heard.

3. Leave set tuned to the strongest station and remove the battery.

4. With the headset still on, adjust C2 and L2 until you hear the signal loudest. A voltmeter (three-volt scale) connected across C3 will give you a more accurate indication of peak-power adjustment.

This completes the adjustment of the telepower part of the circuit. No future adjustment of this circuit will be needed unless the antenna or location is changed.

5. Now complete the adjustment of circuit No. 1 by screwing the slug in L1 all the way in and adjusting C1 to bring in the lowest-frequency station on the dial. This adjustment is to assure maximum coverage of the broadcast band.

To get any AM broadcast within range of your receiver, after the initial adjust-

tions, changes it to DC and stores it in a condenser, which then acts as a battery. Up to eight volts has been maintained across the condenser with the power circuit tuned to a nearby TV transmitter. While this set can tune in the program from any AM broadcasting station within range, it gets the operating voltages for its transistors from the local TV station.

This is a deluxe version of an invention by Lloyd R. Crump, an electronics specialist at the Army's Diamond Fuze Laboratories. He has coined the word "telepower" for his patented principle of powering electrical devices with energy captured from the air.

To demonstrate the practicality of his idea, Crump has designed the simple broadcast receiver described below.

You can easily build it yourself from standard radio parts, or you can get a kit of parts from the inventor for \$6.50. (L. R. Crump, 12108 Atherton Drive, Silver Spring, Md.)

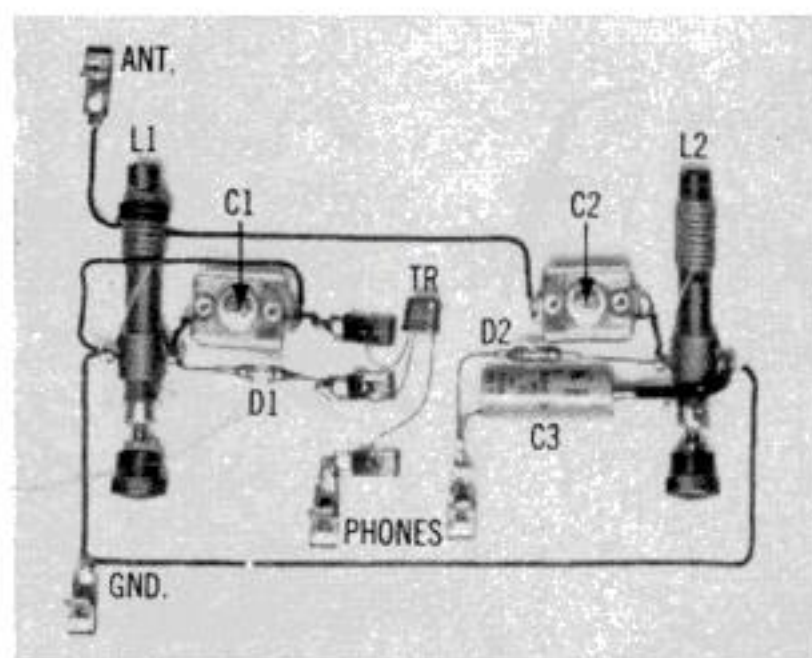
But entertainment is only a sidelight to the more important uses to which the invention can be put. The principle can also be used to power miniature transmitters. This promises

a host of valuable applications. Since there is no power supply to deteriorate with age, such a transmitter could be planted as a location marker that would send out its telltale signal every time it was excited by the transmitters in passing airplanes or ships. It could be concealed as a listening device that an operator at a remote location could energize at any time and then listen to. The cloak-and-dagger possibilities are obvious.

As a remote-switching device that would be continuously alert, it could set off explosives, turn beacon lights or warning signals off or on, or operate a garage door's opening apparatus.

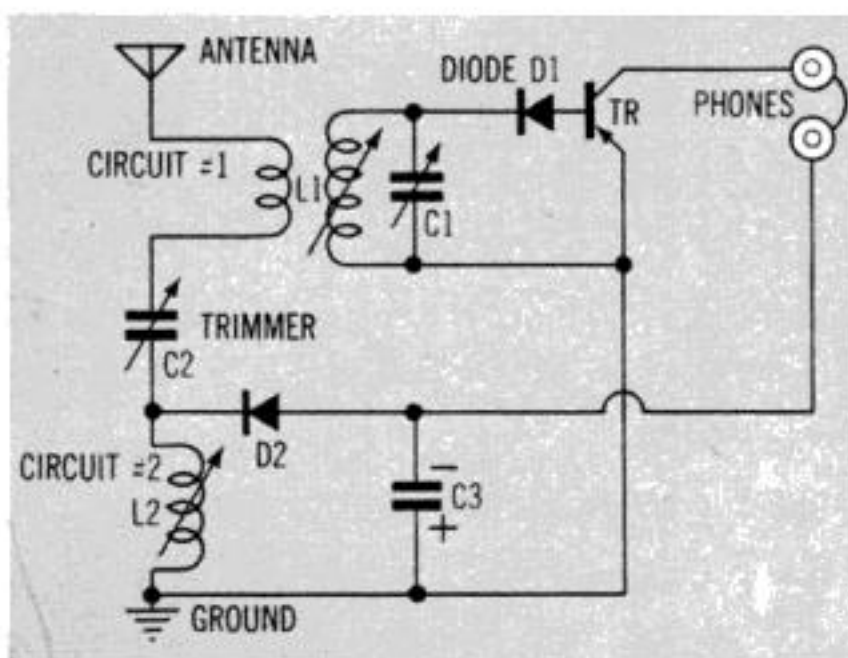
Fixed-tuned receivers powered by a central transmitter could call emergency crews, act as civil-defense alarms, or be used as office intercoms.

This whole field of inquiry is brand new. The most valuable applications may come from experimenters and hobbyists working with the basic principle. Further research, coupled with development of special circuit components, will, Crump says, extend the horizons far beyond present applications.—Hubert Luckett.



ment is finished, all you have to do is screw the slug in or out of L1.

The antenna needed will vary with station power, distance and other factors. As a general rule the longer and higher, the better. But this set has operated at overload volume with only a three-foot wire for an antenna, one mile from a small (500-watt) station.



Parts List:

L1, L2: High-Q, ferrite core, broadcast-band antenna coil with knobs

D1, D2: IN34A crystal diodes

TR: PNP (Ck 721 or 2N77) transistor

C1, C2: 5 180-mfd. trimmer condensers

C3: 10-mfd. low-voltage electrolytic condenser

Headphones: 2,000-ohm magnetic

Our First 5,000-Mile



Missile Is Ready Now

Are we overlooking a bet in the Snark, our NON-ballistic intercontinental weapon? Here are facts on its strengths and weaknesses

By Wesley S. Griswold

WHILE all the talk goes on about whether or not we're behind the Russians in long-range striking power, one often-overlooked fact is worth remembering: We already have a guided missile that can carry a big hydrogen bomb 5,000 miles and drop it smack on target.

The Snark, a 69-foot, jet-powered, winged weapon with a self-contained guidance system that cannot be jammed, first proved that it could do this awesomely difficult job last October 31. With a dummy warhead in its sharp nose, a Snark on that day thundered up from Cape Canaveral, Fla., leaving a slim vapor trail to mark its swift climb into the southeastern sky. A few hours later,

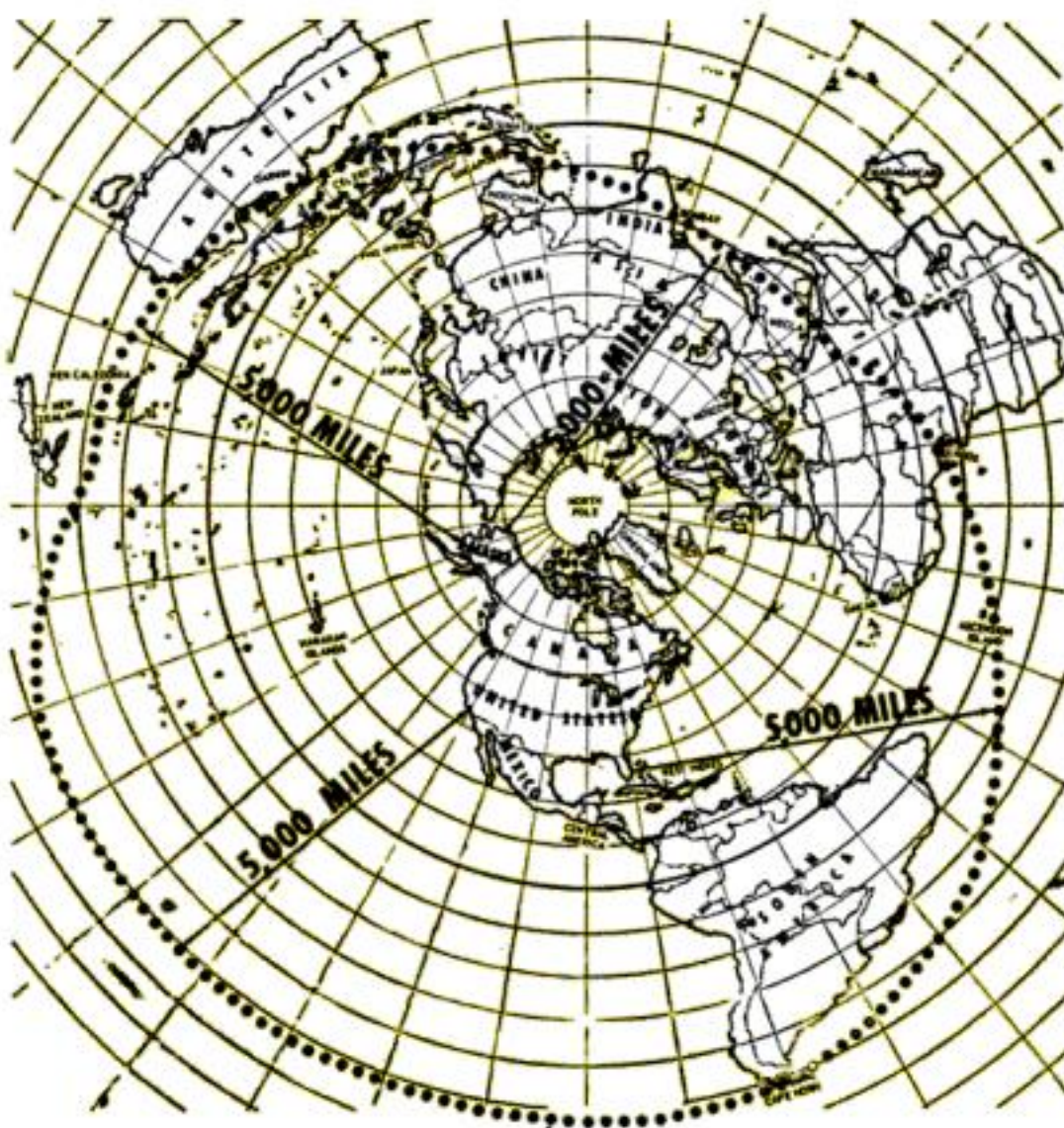
it dove at supersonic speed to its intended goal—a 5,000-mile-distant point in the Atlantic Ocean near Ascension Island, between Brazil and Africa.

Within five weeks another Snark performed the same outstanding feat, and the Air Force told the world that the U. S. possessed a missile of intercontinental range and "unprecedented accuracy." It added that the Snark up to then had made more than 50 successful flights. Totalling something like 75,000 miles, they gave evidence of a seasoned weapon, with developmental kinks ironed out.

Yet, at this writing, only a few score Snarks had been ordered from Northrop Aircraft, Inc., of Hawthorne, Cal., which developed the weapon and has been building test models of it for the past six years. The Air Force has set up only one Snark

A Snark in flight—and possible destinations

Head-on view, left, shows Snark's takeoff with twin rocket boosters. Always ready to fire, missile can be let fly on a moment's notice. Suggesting a giant stinging insect in appearance, it is designed to carry warhead of any type, including hydrogen bomb. Launching platform in photo will be replaced by a mobile launcher in the field. Test Snarks like this one are painted red, standard color for experimental missiles and planes; operational Snarks will be silver, with AF markings in red, white and blue. Map at right illustrates almost-worldwide area (within dotted line) to which Snarks could fly from continental U.S. territory alone. Only Australia, part of Africa, and southernmost Asia would be beyond missiles' 5,000-mile range. First actual Snark base, at northeastern tip of U. S. in Maine, will be within reach of all of Europe and the northern part of Asia.



squadron, assigned to a base at Presque Isle, Me., but still in training.

With not even a modest number of intermediate-range ballistic missiles yet in readiness at bases with trained crews—and with our intercontinental ballistic missiles still further away—why hasn't the Snark been rushed into mass production to fill the gap meanwhile? And why does Snark still lag, if those responsible for our missile program haven't advanced its production schedule by the time this is read?

The answer is that not all top Air Force officials agree on the merit of the Snark.

Those officers who are rooting for it make these points:

- The Snark, truly our first intercontinental missile, is way beyond the trial-and-error stage, which our IRBMs and ICBMs will be struggling through for many months to come.

- It is already being produced in greater numbers than any other long-range U. S. missile. All-out production of it, therefore, could be achieved much faster than in the case of the others.

- Its guidance system, of critical importance to any intercontinental missile, has repeatedly endured launching shock without damage and proved itself remarkably accurate.

- It can be kept fully fueled and ready for immediate takeoff at all times. This is not true of the IRBMs and ICBMs

that use liquid oxygen, which evaporates rapidly on standing. The Snark uses the same jet fuel that planes do.

- It is highly mobile. Snarks can be airlifted in a day or two to any part of the world where a C-124 transport plane can land. Once there, they can be placed on portable launchers and fired from the handiest flat patch of ground. Then the launchers and birds can promptly be moved to a new, safe location for the next firing. IRBMs and ICBMs, with launching platforms rooted in concrete, cannot be shifted around and thus cannot dodge return fire.

Critics of the Snark say:

- It flies too low and too slow—making it vulnerable to conventional AA missiles, and even to supersonic interceptor planes. It would take a Snark eight hours to fly from Cape Canaveral to Moscow. A Russian ICBM could whiz from Moscow to Cape Canaveral in 20 minutes.

- The money it would take to produce many squadrons of Snarks might better be used to increase future stockpiles of IRBMs and ICBMs.

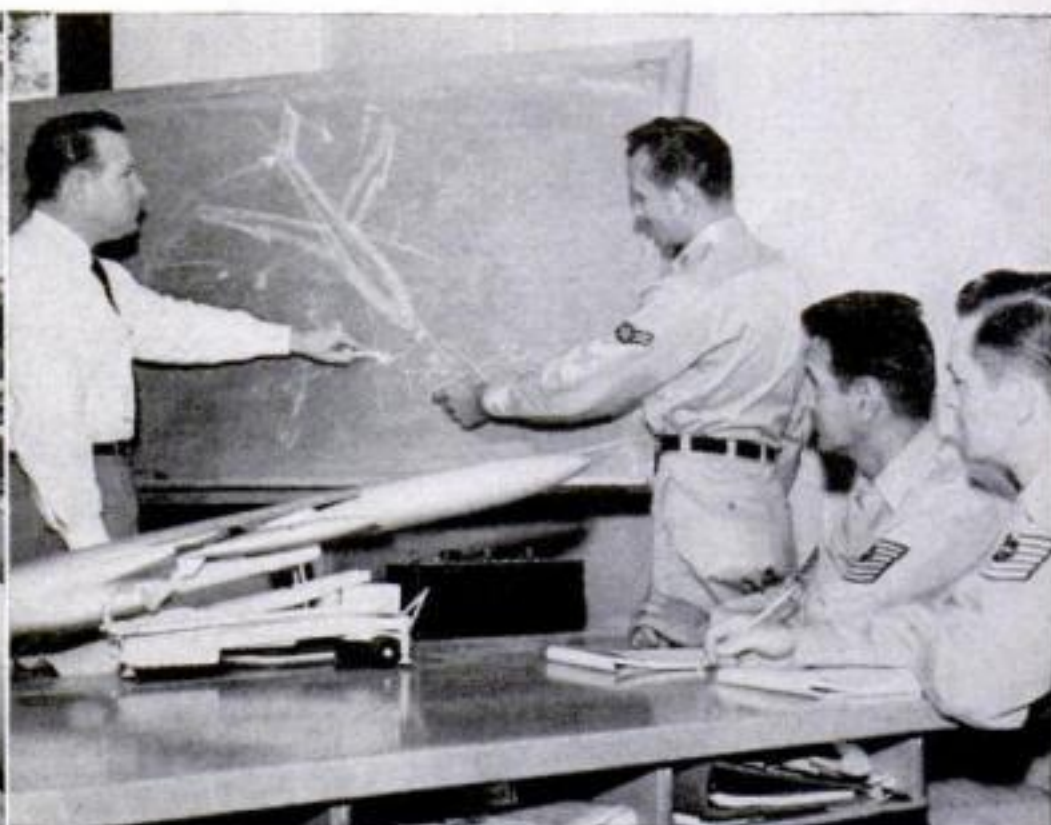
Snark advocates reply:

"Nobody's saying that the Snark can take the place of an ICBM, but we've got the Snark, and we won't have the ICBM for a long time yet. Wouldn't it be wise to have lots of Snarks to strengthen our long-range striking force, while we're waiting for the ballistic missiles?"

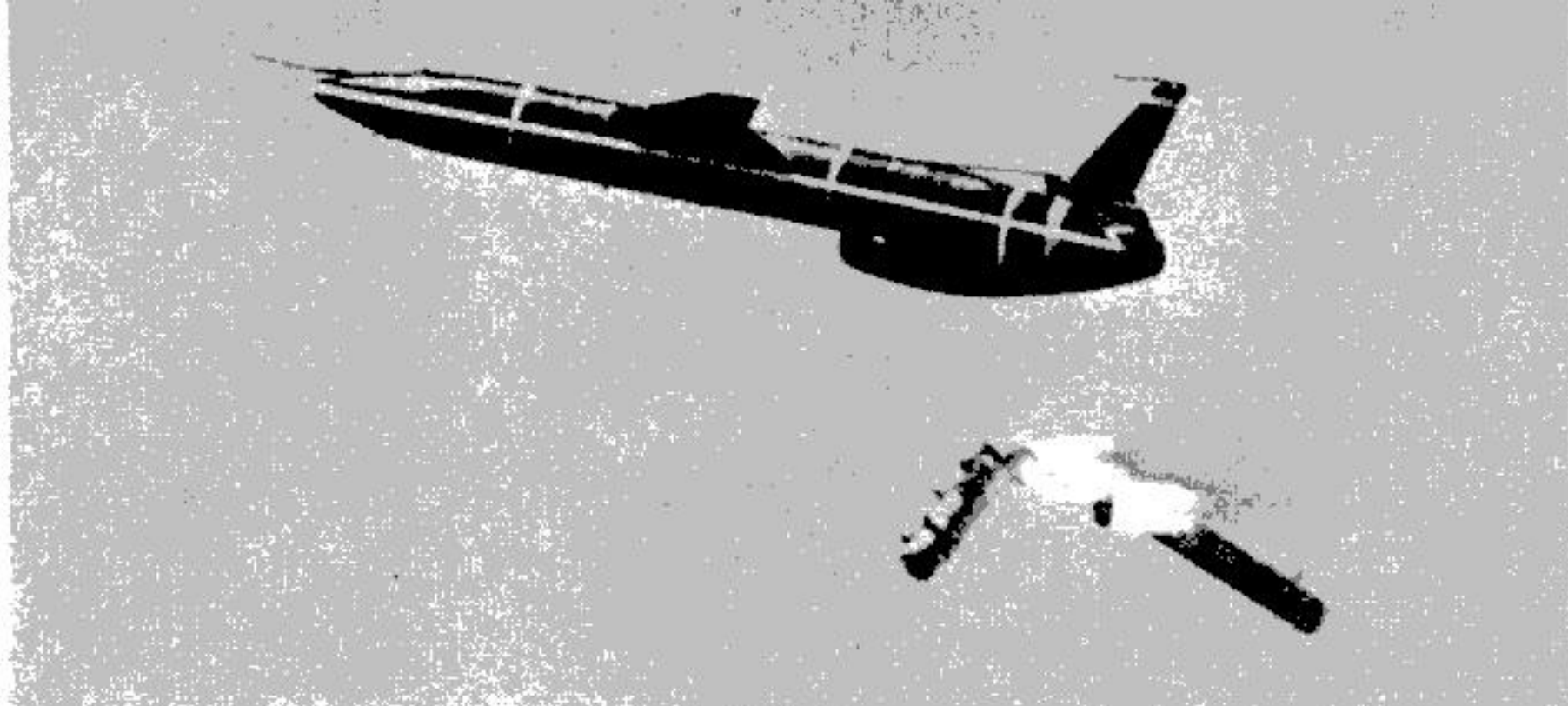
And a Snark, they maintain, isn't so



PRODUCTION LINE hatches Snarks in Hawthorne, Cal., plant of Northrop Aircraft, Inc. Missiles have been assigned to operational duty with units of Air Force's Strategic Air Command.



FIRST SNARK SQUADRON, for AF's new base at Presque Isle, Me., gets preliminary technical instruction. On table in foreground is model of Snark poised for flight on mobile launcher.



After launching, Snark drops spent boosters, and turbojet propels it at near-sonic speed.

easy to detect and shoot down. First, it can slip through electronic nets easily. Clean-lined, it's free of most of the "corners"—right-angled joints of surfaces—that catch and reflect search-radar pulses. Even the most sophisticated radars can't find a Snark until it's near enough to do ruinous damage. (Test Snarks, soaring over the Atlantic range, have to be equipped with special electronic beams so that our own radars can find and follow them.)

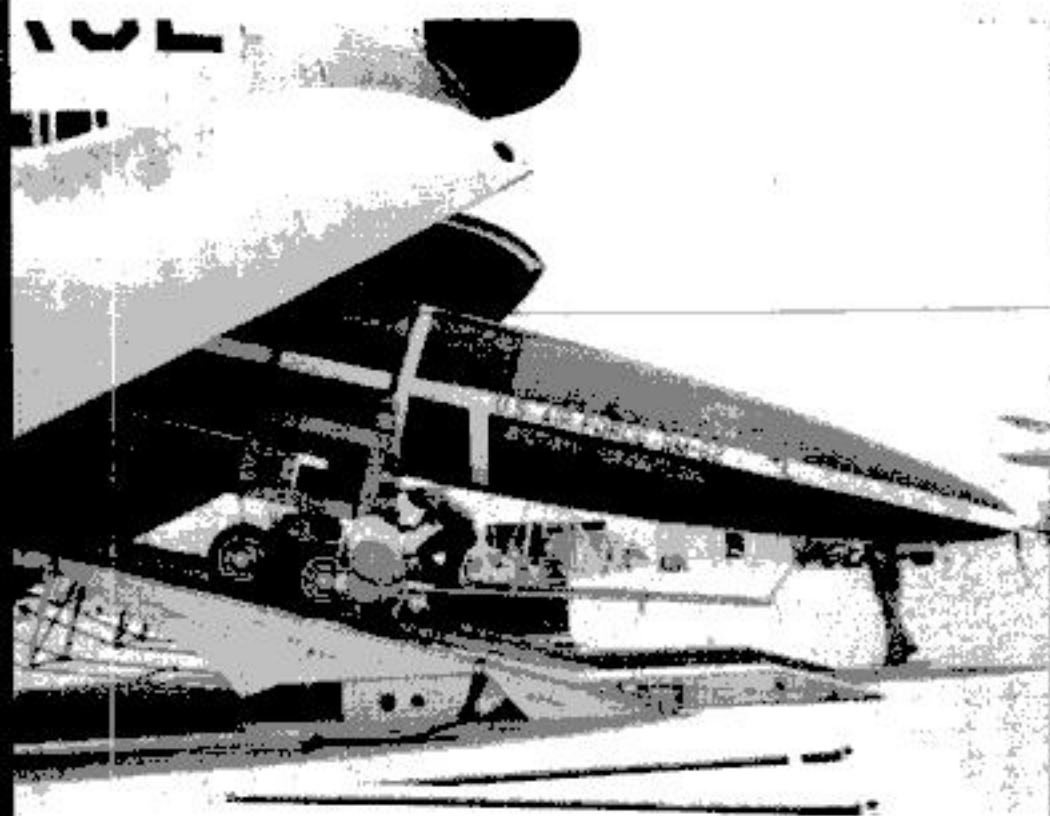
To enemy defensive missiles that are infra-red seekers, the Snark presents only one small target—its single engine—in contrast to our biggest jet bomber's eight.

Snarks can be equipped with electronic countermeasures, devices that so confuse enemy radars that they think a whole squadron is approaching for each actual

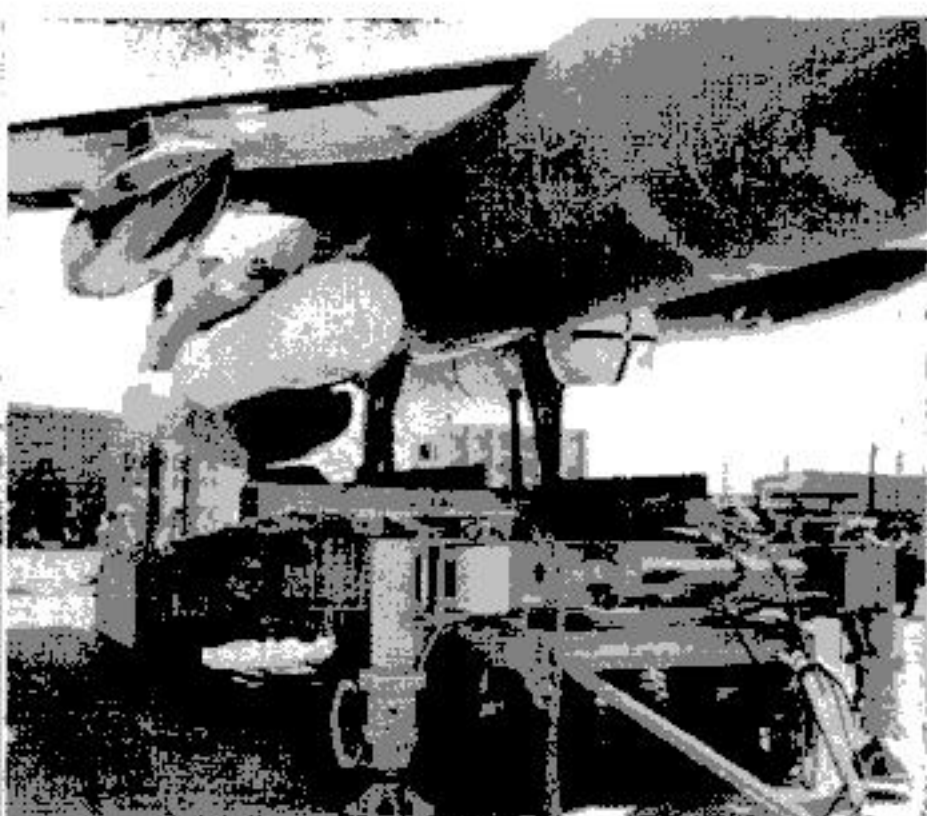
missile. This leads to wild anti-aircraft fire and a fruitless squandering of fighter strength.

A *Snark's* flight can be programed to end with a low-level approach to its target. It can come in so close to the ground that it is practically immune to AA fire, lost to enemy radars, and exceedingly hard for defending fighters to pounce upon without smacking into the earth.

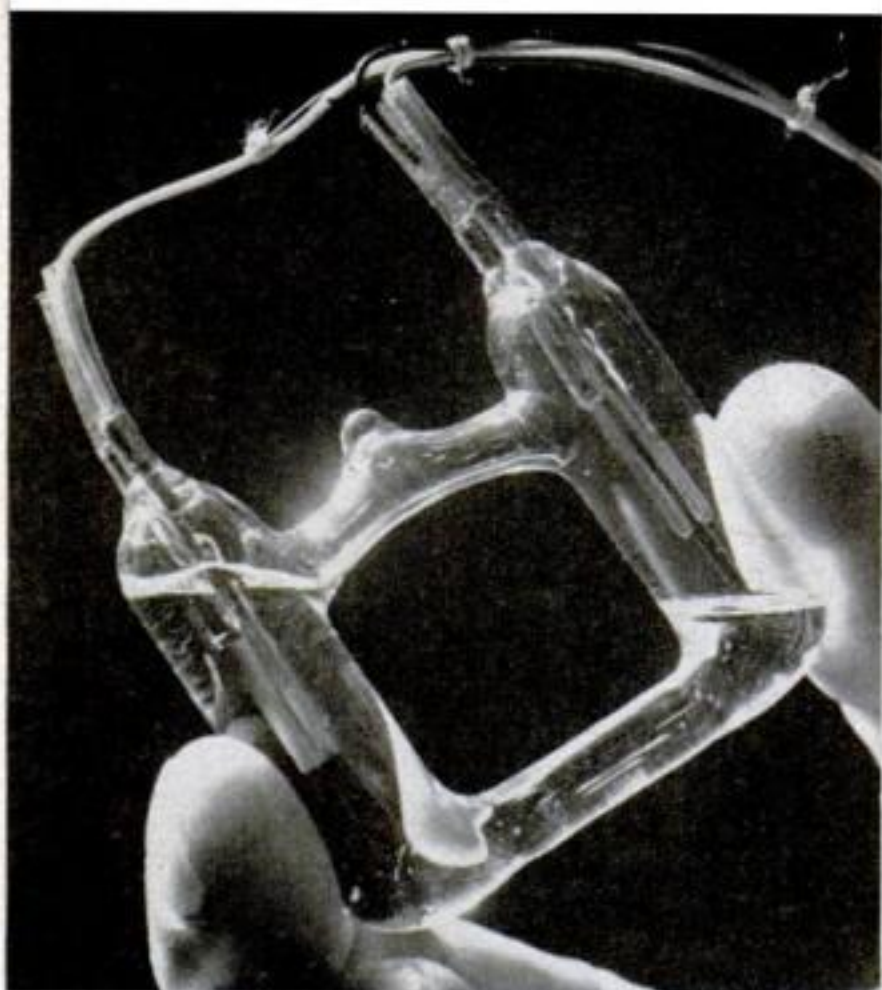
Though the initials of its official name, SM-62, stand for "Strategic Missile," the Snark looks like a plane. It is, in effect, a pilotless bomber, 1/10 the size of a B-52 and in large quantities about 1/20 as expensive. It is comparable to a modern fighter in length, wingspread (42 feet) and height (14½ feet to the tip of its narrow tail). With warhead and fuel



BY AIR, Snarks can be rushed to any launching point in world. Above, missile's fuselage rolls into C-124 Globemaster. Wings and tail go next. Another C-124 carries the mobile launcher.



MOBILE LAUNCHER, with Snark in place, rolls on 16 tires. Tractor or half-track tows it to place of firing—which may be any flat, open field or clearing, a few missile-lengths long.



WITH ACCELEROMETERS like this, by movements of current-carrying liquid around tungsten electrodes in glass tube, guidance system measures changes of velocity and direction in flight.

aboard, it weighs about 20 tons. Underwing auxiliary fuel tanks, with an automatic transfer system to keep the Snark on an even keel as it burns up its fuel, can stretch its range to 6,000 miles if necessary.

In flight, the Snark is powered by a single J-57 turbojet engine, with 10,000-lb. thrust. The missile's top speed is around 650 m.p.h., and it can fly at heights ranging all the way from just above the treetops to altitudes over 50,000 feet.

Two solid-fuel rocket boosters developing more than 100,000 pounds of thrust apiece, attached to the Snark's sides, launch it without need of a takeoff run. First, by remote control, the missile's engine is throttled up to 95 percent of full power. Then, while electrical and fuel lines drop away, the rocket boosters ignite with such violence that within two missile lengths the Snark is traveling at full speed. In a few seconds, the spent boosters are shed and the missile is off on an intercontinental mission.

The Snark is now wholly under the control of its extraordinary guidance system, which combines inertial guidance and star tracking, and functions without help from radio or radar. Since the system neither broadcasts electronic impulses nor receives any, it never gives away its presence in the limitless sky. No enemy signals can seek out and befuddle it. And it is immune to interference from

electrical storms, sunspots and the earth's magnetism.

In principle, here is how it works:

A memory drum in an airborne computer contains exact information on where the Snark ought to be, and what it ought to do, at any particular moment during the flight.

A team of gyroscopes and accelerometers tells the computer where the Snark actually is, and what it is actually doing. That team gets intermittent help from a telescopic eye—which automatically sights on one or more predetermined stars, whenever clouds are not in the way, to double-check the Snark's position.

If these instruments' reports differ from the program on the computer's memory drum, command signals flash to an automatic pilot. With flight controls, it steers the Snark back on course.

Before a Snark roars off on a mission, men must perform precise aeronautical and astronomical calculations to make up its program. These instructions are coded, and fed into the computer's memory drum on magnetic tape or punched paper tape. Also, the memory drum is fed sets of alternative commands to get the Snark out of trouble and back on schedule, in case it runs into turbulence or adverse winds.

All the information supplied to the memory drum is keyed to a rigid time schedule, kept by an extremely accurate clock. This clock also automatically makes corrections to take account of the rotation of the earth.

The gyroscopes are fastened to a little platform in a box, and the platform is gimbal-mounted to keep it independent of the Snark's body. At the start of a Snark flight, the gyro platform is perfectly level; a perpendicular line down through its middle would pass through the center of the earth. During flight, whenever the Snark's movements threaten to tilt the platform, the gyroscopes resist the tilting and persistently restore the platform to its original position.

The accelerometers are mounted on the same platform. They measure every movement, as acceleration in that direction, and flash the measurement to integrators in the computer. The integrators convert acceleration to velocity, then to distance traveled.

[Continued on page 254]



Tip to planners-ahead:

We Took a Houseboat Vacation

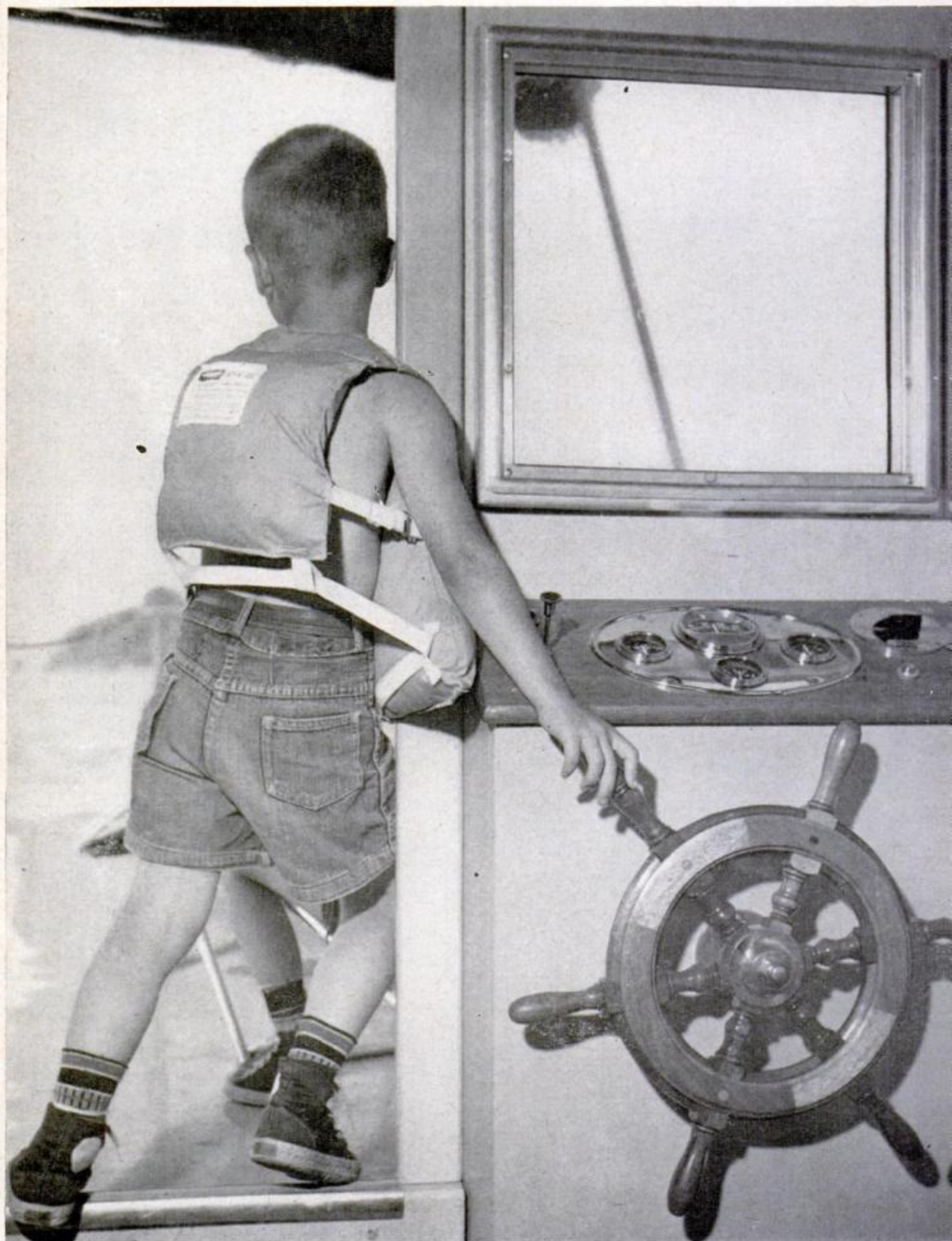
By George Laycock

OUR houseboating vacation began when we discovered that now you can *rent* one of these spacious barges. On the Ohio River, not far from home, two new houseboats were available at \$110 a week each.

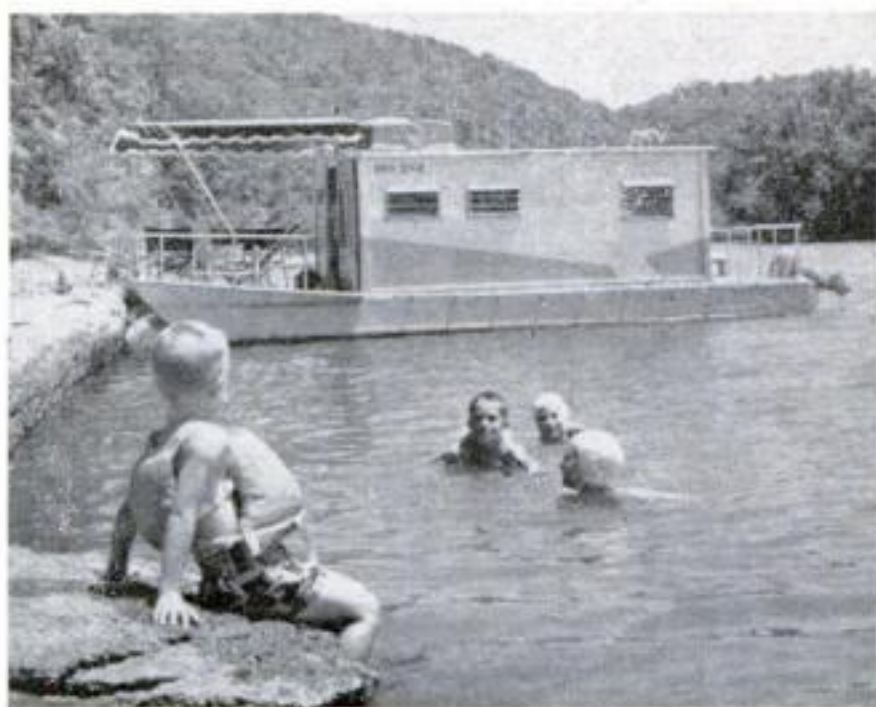
We chose the *River Queen*, a steel-hulled boat 24 feet long by nine feet wide. Her cabin had a picture window, a fully equipped kitchen, two bunk beds, clothes closet and "head" (lavatory). Controls were inside for the captain's comfort in



Tying life jackets on Steve, 6, and the two older kids whenever they came on deck ended our main concern. They tied jackets on toy animals to get even



Even our youngest crew member took tricks at the wheel when traffic was light. Propelled at a lazy five or six m.p.h. by its 25-hp. inboard, the River Queen proved highly maneuverable despite its ungainly shape. Simple charts showed the channel and helped us plan rest stops



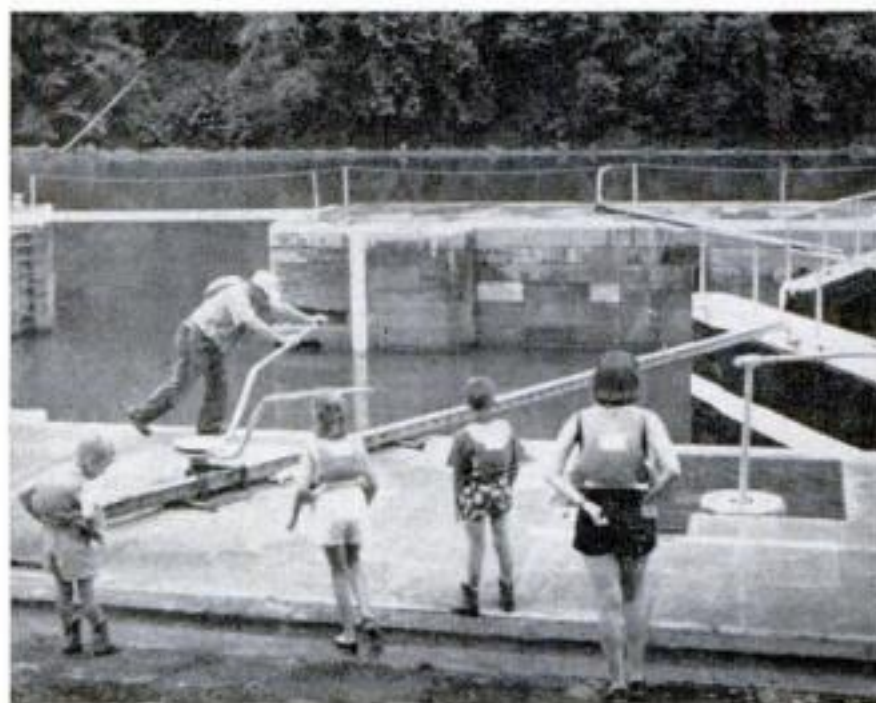
In the middle of the day we'd stop for a swim in the Kentucky River. The boat's steel hull made it safe to tie up so long as there was enough water to float

bad weather. You could enjoy the sun on the upper deck or shade under the canopy over the foredeck.

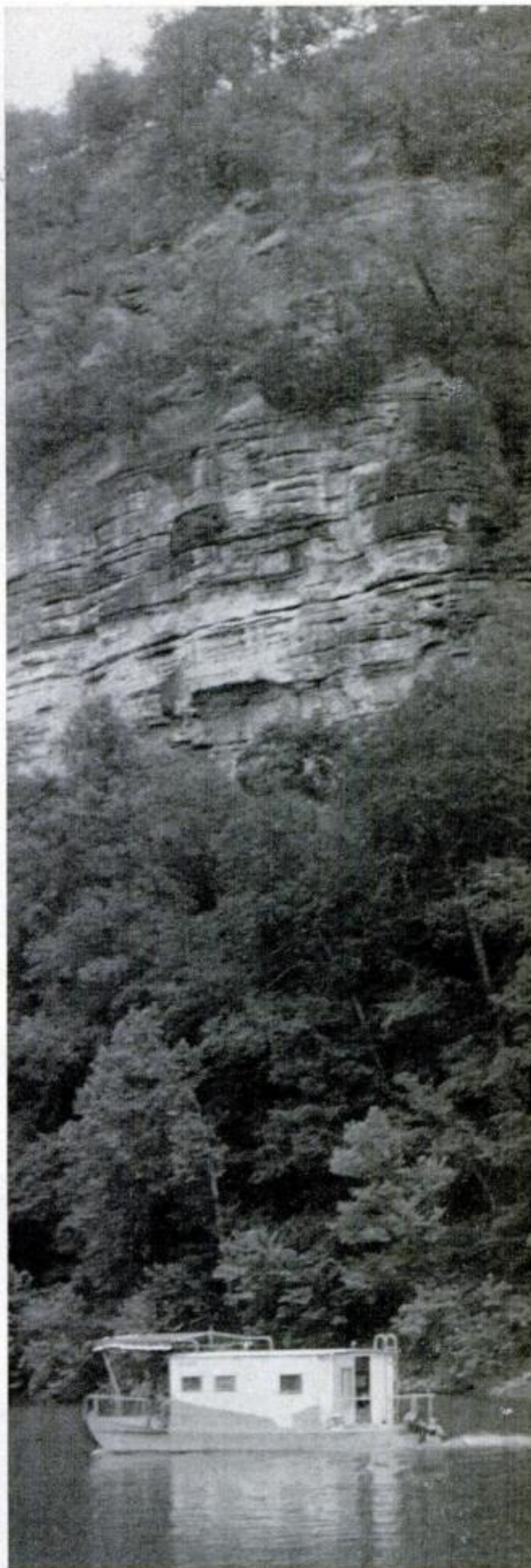
For 10 days we cruised on the broad Ohio and the narrow, twisting Kentucky River. We covered 450 miles, moving lazily along, by day only, five or six miles an hour. We rounded one bend after another, never looking at the same landscape twice. At night we stopped wherever we happened to be and tied up to a nearby tree or dock.

There was no worry about advance reservations, no search for restaurants, no highway traffic to fight. We fished when we wanted to, swam when we liked. The

[Continued on page 236]



We locked through five dams on the Ohio, seven on the Kentucky. All the latter's dams, like this one, still have hand-operated gates. Some are 115 years old



Early American history was made on and alongside the Ohio and Kentucky. Washington, Boone, Johnny Appleseed and Audubon knew the rivers well

From the labs...

Tires That Ride Softer But Last Longer

By Robert Gorman



FRAMED BY LOW-PROFILE TIRE are three other experimental types for which special advantages

are claimed: butyl (soft ride), polyurethane (abrasion resistance), wire cord (high mileage).

What Does a New Tire Need?

Before any new material for tires can go into production, it must prove itself under a wide range of operating conditions. Some features can only be had by sacrificing others; a single defect may offset a dozen virtues.

What do tire men test for? The items below, taken from a 56-point checklist used by U. S. Rubber Co., cover some important features.

Before a tire is even tested, material and production costs are carefully figured, and stylists must approve its appearance. They rate it for massiveness, for harmony with the outlines of cars on which it will be used, for durability of color and decorations.

A change as small as shaving a half-inch from a white-sidewall band, they say, can make or break a tire. Or a good tread may be dropped if it looks too hefty from the side.

High-speed pikes and heavier, faster, lower cars make tough going for tire manufacturers. What are they doing to catch up?

"Now here, you see," said the Queen, "it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!"

—Lewis Carroll
Through the Looking-Glass

TIRE companies are running extra hard these days, trying to beat the Alice-in-Wonderland trend of the last half dozen years. For in spite of the substantial improvements they have made in this period, their product has barely kept pace with speeded-up requirements.

The combination of faster roads and heavier, higher-powered, lower-slung, softer-sprung, power-steered and power-braked cars has whittled away the improvements the tire makers have been building into their product. Now major technological breakthroughs are needed, and the search is on in earnest. The laboratories hold out hope for tires that will last longer, give you a softer, quieter ride, improve car handling, offer more safety at higher speeds.

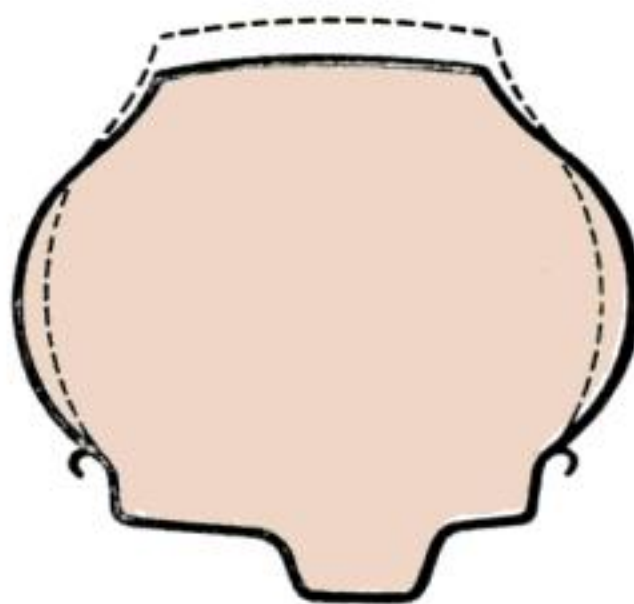
Tomorrow's tires can be fairly well pre-viewed. Research is centering around the creation of polymers—synthetic rubbers—that promise better wear and more comfort. Probable new ways of building tread and carcass aim in the same direction. If Detroit has its way, your fifth tire will soon disappear (see box, p. 120) and the remaining four will shrink more than they have already.

But: Partly from fear of tipping company plans, most tire men are tight-lipped about their laboratory projects and tend to emphasize weaknesses of new materials, not virtues.

A more important reason for cautious

forecasts: Tire advances usually depend less on what rubber experts know than on what car designers want. Most new tires are joint developments by tire and auto companies. The differing interests of the two camps sometimes lead to heel-dragging.

A case in point may be shallower tires. Most rubber companies take a dim view of the so-called "low-profile" tire introduced last year as standard equipment on the Cadillac Eldorado Brougham's 15-inch wheels. U.S. Rubber Co., which



LOW-PROFILE TIRE, shown by solid line, is shallower in cross-section than standard tire (broken line) but handles better, takes greater load, and can be run at higher speed.

makes the tire for Cadillac, hails the squatter, more elliptical tire as the forerunner of a trend.

Fashion considerations would seem to support this view. To keep building ever-lower, heavier, longer cars involves new drawing-board concepts that must face mechanical facts of life.

For example, cars can be made lower by reducing wheel-rim diameters—but

PERFORMANCE:

Evenness of tread wear
Antiskid mileage
Traction
Resistance to cracks and cuts
Ply or carcass separation
Steering effort
Bead failure
Sidewall scuff resistance

SAFETY:

Directional skid resistance
Heat build-up and strength
Blowout resistance
Stability
Wind drift
Cornering stability
Steering-wheel response
Fabric breaks

COMFORT:

Cornering noise (squeal)
Braking noise
Expansion-joint noise
Retention of stones
Car-radio interference
Thump
Riding softness (deflection rate)
Harshness

smaller wheels force a reduction in braking area, so safety considerations limit this approach.

Size, however, is just one of the advantages claimed for the new tires. Technically, the term "low-profile" describes any tire that, seen in cross-section, is wider than it is high. A major reason for lowering a tire's height-to-width ratio is that, for any given diameter, a wider tire will carry a greater load. Moreover, the squatter cross-section is obtained in part by reducing the angle at which body cords cross the centerline of the tread. Though this makes the ride slightly harsher, it raises top-speed capacity and improves cornering stability and steering-wheel response.

The tire sounds good—yet only its parents act proud of the new baby. Most other tire people shrug off the low profile as an innovation of little value and even less future. Their reasons are chiefly economic, with a faint hint of sour grapes.

By and large, rubber companies welcome Detroit's changes in tire styles about the way an average man welcomes a long visit from his mother-in-law: It's

a disruption you can live with, but would rather avoid.

Tire plants can easily build any tire to a set of specs. But to supply the replacement market with a choice of four qualities, rayon or nylon cords, black or white sidewalls, regular or snow treads may mean as many as two dozen varieties for each new size. It's a jumbo production and merchandising headache.

Many tire men also say that tires *shouldn't* get smaller than they are, especially if speeds continue to rise. For, other things being equal, larger tires run cooler, wear longer, and handle better. By this argument, the cord angle that gives low profile superior speed and stability can be—has been—used to better advantage in tires of conventional size.

New rubber compounds might meet some of Detroit's objectives and the tire industry's problems.

Butyl—or a similar polymer—tops the likely comers. People who have ridden on butyls agree they are sensationally soft and quiet. They are stable, have good skid resistance, are virtually free of braking or cornering squeal.

Tomorrow's Substitute for Your Spare Tire

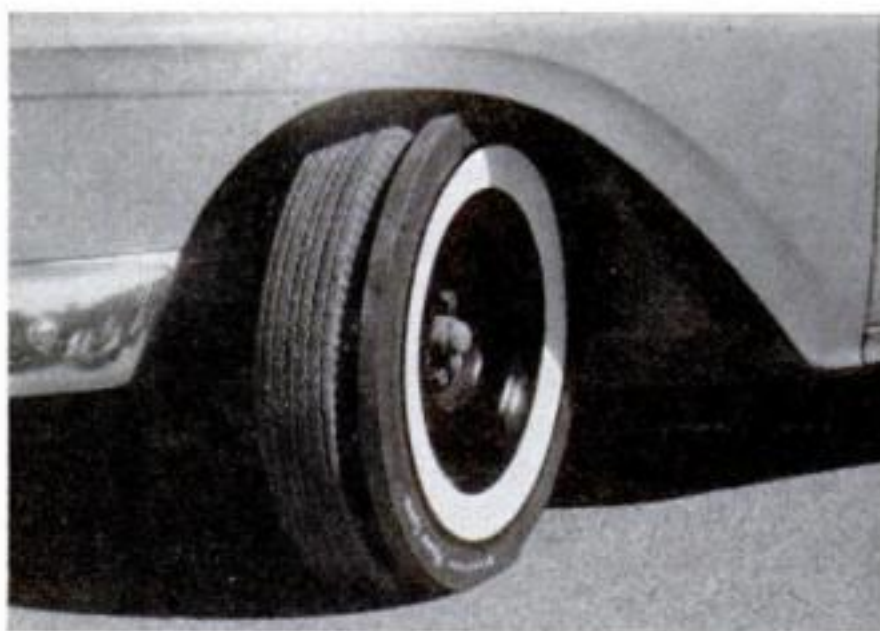
Car designers have designs on your fifth wheel.

For years, it's been a thorn in the side of stylists who have revolutionized the



forward look but couldn't look backward so long as a spare tire had to make its home in the trunk.

Now, a few station wagons have floated free of the past, riding on Goodyear's "Captive Air," or Firestone's "Safety Airlock." Though they differ in details,



FIRESTONE non-pneumatic is a ring of rubber on a thin wheel. Bolted alongside flat (on the same studs), it will carry you for miles at moderate speeds. If gas-tank top were recessed, it could be stored under the trunk mat.

each is a dual-diaphragm tire having a smaller, separately inflated tire inside the regular one. If the outer tire is punctured, you can ride safely on the inner air to the next gas station or a hundred miles beyond.

Their big advantage aside from the

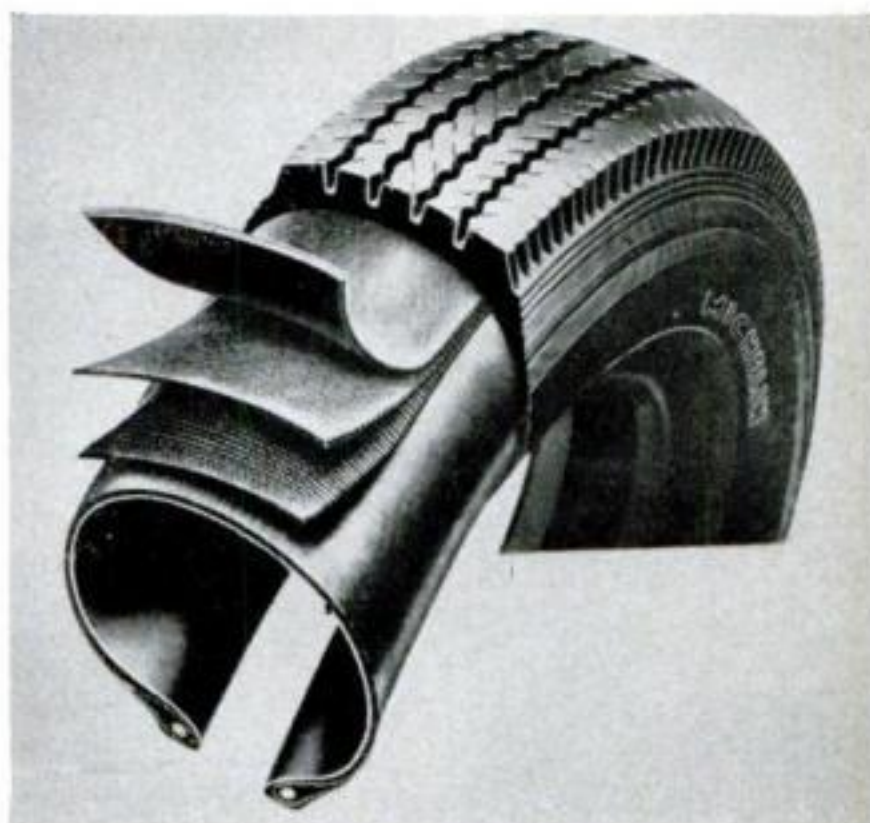
Another quality that has won butyl many friends and influenced Government contracts is its tightly knit molecular structure. Chemists call this property "saturation." With it, butyl tires don't deteriorate when exposed to air or California smog.

Seeking a military tire that could be stockpiled indefinitely without weather damage, the Army backed butyl research. Last summer it announced a success: development of heavy-duty truck tires.

Butyl, the standard inner-tube rubber for some years, was invented in 1937 by two scientists of what is now the Esso Research and Engineering Co. The coming of tubeless tires prompted Esso to test butyl as a tire material.

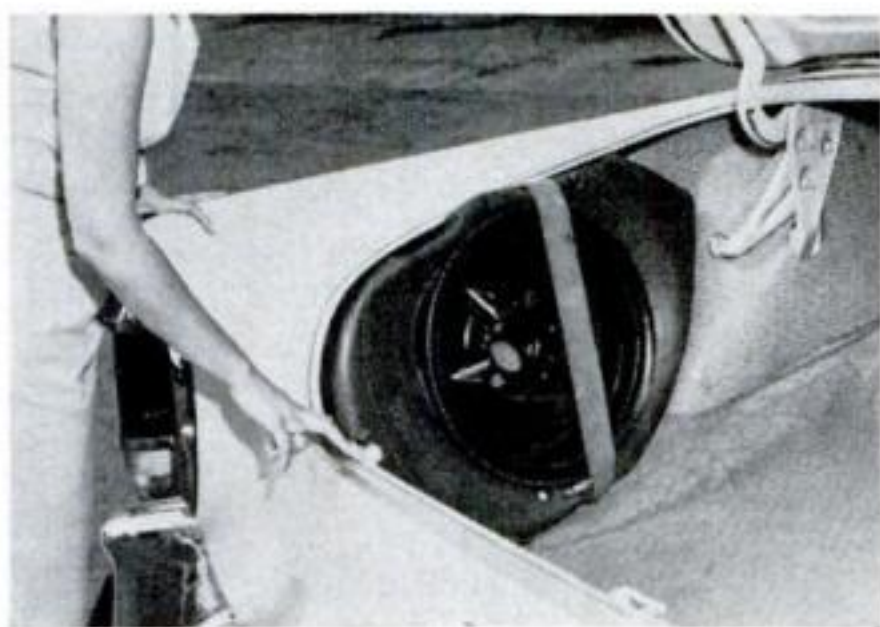
After a poor start, this synthetic made of two oil-refinery gases has come a long way. Early butyl tires fell apart at speeds over 40 miles an hour. They had poor tread life and made steering difficult. Butyl-tired cars accelerated feebly, consumed more gas, and had poor braking traction on ice or packed snow.

Now, say Esso scientists, they have minimized these difficulties, and have beat

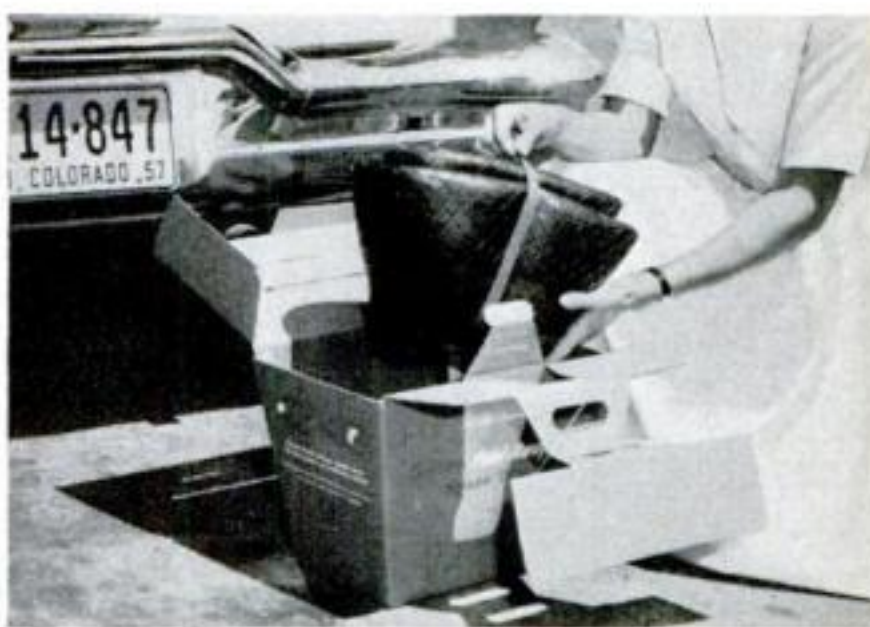


STEEL CORDS, used as breaker strips between the tread and carcass of Michelin-X tires, increase tread wear two to three times. They also improve handling—but only on some cars.

down the cost of commercial production. But considerably more work—or a change in automatic transmissions—may be needed to overcome a major drawback: for butyl's outstanding ability to cushion noise and vibration results from the fact



GOODRICH fold-up is just a roadable inner tube fitted to its own wheel. Deflated, it could be squeezed into smaller trunk space. You'd carry a pressure cartridge to inflate the tire when you mounted it in place of a flat.



GATES wheelless spare and its cartridge inflator would fit anywhere, so it solves all space problems, except where to carry a flat. However, lady drivers might have difficulty getting flat tire off—and spare tire on—the same wheel.

modishness of getting rid of the spare is that you don't have to change a tire in a dangerous place; their main hitch (aside from high cost) is that once fifth-wheel space is designed out of a car, people who want a spare will have no place to put one.

Hoping to make everybody happy, some tire companies have dreamed up a variety of "crutch" tires that take little space yet serve as emergency spares. Three are shown here, others are reported on the way. With any of them you'd have to carry a jack.

that it absorbs more energy than conventional tire compounds. This, in turn, has three less desirable results:

- You need slightly more gas to move butyl tires.

- Their capacity to meet speed requirements of the future may be limited.

- Butyls have greater "rolling resistance"—particularly noticeable when the tires are cold. "Until they warm up," one engineer put it, "you think you're driving with the anchor out."

Nevertheless, drivers will soon have a chance to decide for themselves whether a really velvety ride justifies these inconveniences. An estimated 25,000 butyls have already been made in several pilot-plants, and some of these have been released—unannounced. A step-up in production is expected soon.

A large-scale swing to butyl tires, however, isn't in the cards. There isn't enough of the polymer being made, and it can't be produced in the synthetic-rubber plants that now supply the tire industry. And it is likely that rubber-company chemists will come up with rival polymers with at least some of butyl's advantages. One of these may have been used in a low-squeal tire that was briefly unveiled last December by Firestone. Top engineers called the tire and its unidentified rubber "experimental," but strongly hinted that it would be commercial within "a couple of years."

Polyurethane, long used in foam cushions and shoe soles, is another rubber undergoing active study in the tire labs. The reason? Polyurethane is the most abrasion-resistant tire material turned up to date. This is the rubber that has given rise to hopeful speculations about 100,000-mile tires.

Like other of the harder compounds, polyurethane rides a little rougher and is not yet too highly rated on traction and skid resistance. But its super-durability opens up attractive possibilities:

Treads. They could be made thinner to combine greater high-speed safety with, say, twice the mileage of present tires.

And since lighter tires would reduce a car's unsprung weight, they could be expected to improve its riding and handling qualities.

As of now, however, polyurethane's debut as a tire material must be listed as doubtful. The stumbling block is that it can't—so far—be securely bonded to a carcass. Experimental tires have been made entirely of polyurethane to get around the bonding problem, but these aren't considered satisfactory prototypes.

The outlook, of course, could change overnight—if a satisfactory method is found for bonding the dissimilar polymers of tread and carcass. Growing concern for safety and tread life will continue to spur the search, but chemists aren't bubbling with hope.

Cords and construction. One method of extending tread life is by compounding rubbers for greater abrasion resistance. A parallel approach consists of stiffening the tread area to reduce effective abrasion.

There are many possible tread stiffeners, but of those now available, few have the all-around advantages of steel-wire cords. In strength, wire cords far outclass fabrics and make a tire practically immune to blowout. Fewer plies are needed, which means that tires run cooler and with less chance of failure. It's not surprising, therefore, that truck-tire lines are adopting some wire-cord models.

Can these virtues be carried over to passenger tires? American experts say the prospects are remote. But if you're impatient to drive on wire cords, you may find your tire size in a line of French imports available right now. This Michelin tire, known as the "X-type," has three layers of woven-steel cord between the tread and carcass.

Fabric cords are used in the body, but instead of being cross-woven, they are formed like an arch, with each cord running from bead to bead. Though this makes the wall easier prey to curb-scuffs and bruises, the unstretchable tread of



BUTYL TIRES for military vehicles, built by Mansfield Tire and Rubber Co., have been tested and okayed by Army Ordnance.

[Continued on page 244]

The writer, pale but resolute, is shown here with Major Herbert Stallings, pilot of the plane in which the "weightless" flight was made



I Was Weightless for 39 Seconds

How does it feel to float in space? PS reporter acts as a guinea pig—and shares with you his extraordinary sensations

By Eliot Tozer

YOU'RE in for a thrill if you ever take a ride in a spaceship. You'll feel as though you've just reached the top of a roller coaster—and you'll hang there for the rest of the trip through space. It will be like a pleasant dream without sleep. You'll barely hear the monotonous click and hum of the spaceship's electronic gear. You may wish you never had to come back.

Or you may be as sick as a dog. You may feel hot, feverish, then shudder with cold, struggle to draw each breath.

How come?

You'll be weightless. When your spaceship rockets up to orbital velocity, canceling out the earth's gravitational field, the normal reassuring pull of gravity will give way. The sensors in your inner ear, your skin, muscles, and connective tissue will go limp and you'll enter a strange

and dream-like state of mild exhilaration—or get sick.

All this the doctors told me at the School of Aviation Medicine, Randolph Air Force Base, Texas, where they are studying the effects of zero gravity on human behavior and physiology. Knowledge gained from these experiments will be of immense value in designing the manned earth satellites and space vehicles of the future.

POPULAR SCIENCE had sent me down to Randolph to join the little group of men—there are not very many—who have been truly weightless and record my sensations while in that strange condition.

Now the medics were giving me a thorough physical examination. Later, after a pressure-chamber "flight" to 25,000 feet, I would strap myself into the back seat of an F-94C Starfire and climb about five miles above south Texas. There, with Major Herbert Stallings at the con-

"My feet were off the floor and my body was floating up

trols, I would ride the parabolic arc that produces the longest periods of zero gravity attainable—so far. As an ex-Navy pilot, I had done a good bit of flying, but now I was on the threshold of a totally new experience.

I got my final briefing from Dr. Siegfried Gerathewohl, probably the world's foremost expert on weightlessness. He said, "Major Stallings will dive to pick up speed. At about 450 knots, he'll pull up into a 70-degree climb. Then, with the afterburner on, he'll ease forward on the stick. As he continues to move the stick slowly forward, you'll gradually change direction from almost straight up, to level flight, to almost straight down. As you do, the centrifugal force will throw you up and away from the seat."

"But isn't that negative Gs?" I asked, "as in an outside loop?"

"No, because Herb will fly the airplane so that the centrifugal force always just counteracts the pull of gravity. With gravity canceled out, you'll be weightless from the time you start your climb until you pull out at the end of the arc."

"How does Herb know we're exactly at zero gravity?"

"In our first experiments, we used a standard aircraft G meter," said Dr. Gerathewohl. "It wasn't accurate enough. So we hung a golf ball on a string." He grinned. "When it floats, you're weightless."

Herb helped me adjust the straps on my crash helmet. "You won't be weightless long," he said. "The record in an F-94 is 43 seconds. We can't get up enough speed to hang there longer than that."

We climbed into the jeep and headed slowly for the flight line. On the ground, this jet-jockey was an impressively cautious driver.

"What about the other experiments I've read about?" I said. "I've seen pictures of people floating around in the back end of a DC-3 and floating in water."

Dr. Gerathewohl looked pained. "Anyone knows," he said, "that a DC-3 can't get up enough speed to fly a parabolic arc for more than two or three seconds. As for the water-tank tests, these are valuable—up to a point."

We parked beside the hangar and Herb went off to file our flight plan. Dr. Gerathewohl said, "You see, your body has different kinds of gravity sensors. Most important are the otoliths in your inner ear. Basically, they measure the pull of gravity."

I jotted down "otolith—pull of gravity."

"You also have thousands of pressure sensors, nerve endings in your skin, muscles, and connective tissue. Now, when you float in water, the area of pressure on these sensors is so large—as compared with the supporting area when you sit down, for example—that you may not feel the water pressure at all. It is like being weightless as far as your pressure sensors are concerned, but your otoliths still feel the pull of gravity."

"So if you want to be truly weightless, inside the earth's atmosphere, you have to fly a parabolic arc in a high-speed airplane?" I said.

"Either fly an arc or ride in an earth satellite," he said.

It was nearly four p.m. The left landing gear of the F-94 was dripping hydraulic fluid and Herb was down on his back wrestling with a wrench as I climbed the ladder to the back cockpit. Basil McLeod, crew chief, helped strap me down, plugged in my radio jack, and turned on the oxygen. As he disappeared down the ladder, he said, "Major Stallings will show you how to bail out . . . just in case."

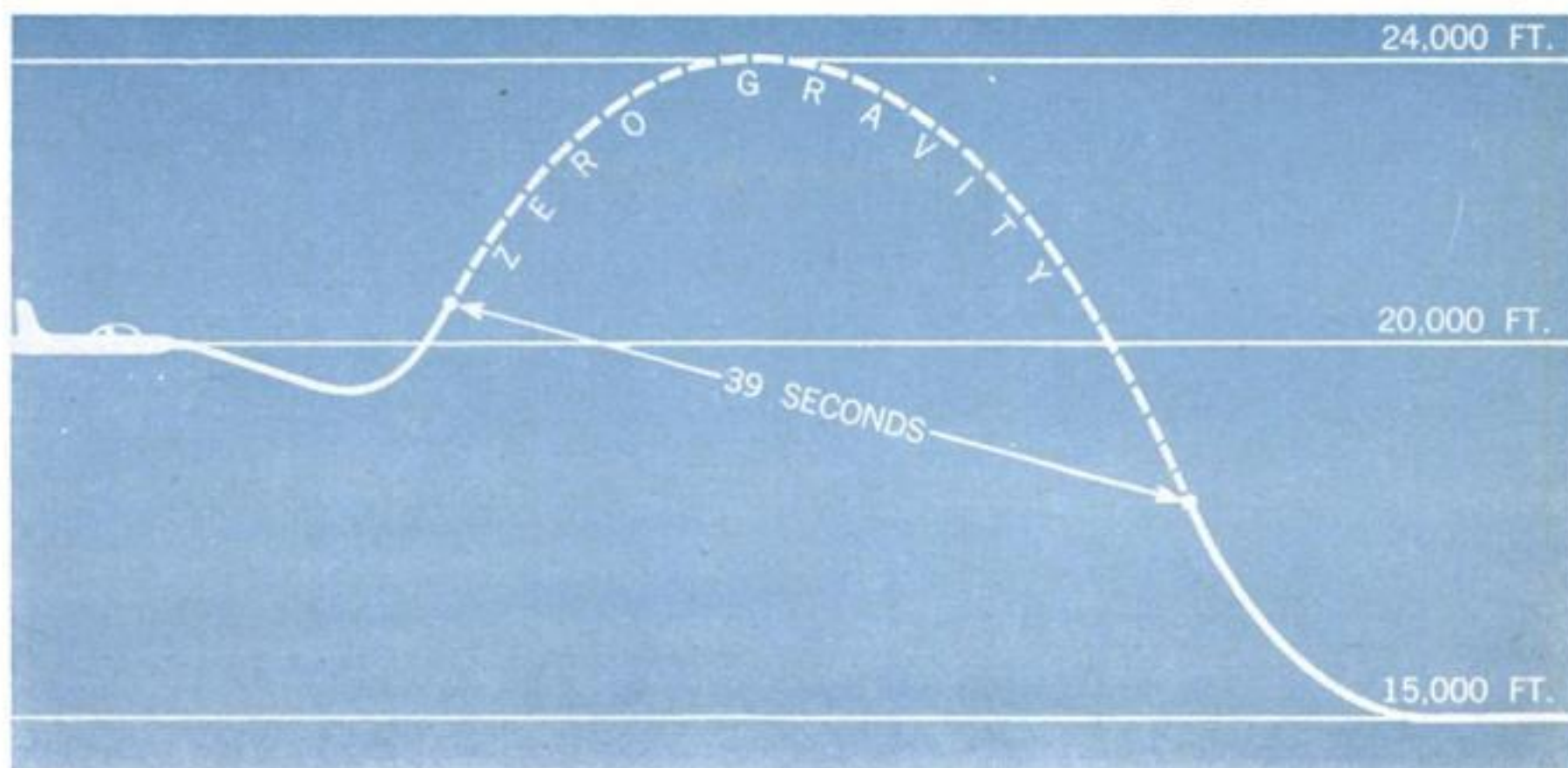
That's good of him, I thought. While Herb and McLeod plugged the hydraulic leak, I looked for a "burp bag"—and found one neatly stashed between two black boxes. I noticed that most of the instruments had been taken out of the back cockpit. There was no control stick, either. No chance to be a hero and land this thing if something happens to Herb, I said to myself.

Herb poked his head in under the canopy to give me final instructions. It turned out that blowing myself out of the F-94 would be comparatively simple: knees together, feet in the stirrups, jettison the canopy, left armrest up, right armrest up, squeeze trigger, pray.

"Let's go," I said.

At 4:16, Herb took a "thumbs up" from

against the seat belt . . . I was on a real champagne kick"



HOW ZERO GRAVITY WAS ATTAINED: Sketch traces trajectory followed by the F-94C Starfire

from level flight through the parabolic arc that induced weightlessness for nearly 40 seconds.

McLeod and hit the starter button. I heard a dull whine behind me and almost immediately we were taxiing out. The mike in my oxygen mask picked up my breathing and sent it roaring into my earphones.

The F-94 is a solid, stub-winged interceptor that corners like a Jaguar, and Herb taxed her like one. I took a notch in my harness.

"Randolph Ground Control," he said, "Six Five Zero for a local flight. Over."

"Five Zero, cleared to runway three-two. Wind, six knots. Altimeter, 30.22."

"Roger," Herb said calmly. Then to me: "Okay, clear the canopy."

Instinctively, I pulled in my shoulders, and the canopy snapped down.

"Switch to 100-percent oxygen."

I fumbled for the switch.

"Ready, chase?" he called.

Capt. Warren Simpson pulled up beside us in a T-33. He would lumber along behind and below us to help us stay clear of traffic while we flew our parabolas. I heard him mutter, "Roger."

Herb got on the horn for final clearance and wheeled the F-94 into position for takeoff.

Something belted me in the backside. From the thunder that shook the F-94, I gathered that Herb had cut in the afterburner. Within 25 seconds, we were off and climbing. I started to look around at

the view, but it was gone. "How fast are we climbing?" I said.

"About 6,000 feet per minute."

At that rate, the flight would be over before my stomach got off the ground.

We bounced through some clear-air turbulence and the F-94 shuddered. When she settled down, Herb said, "Are you all right?" and someone answered for me, "Affirmative."

"Okay," said Herb, "let's try one. Remember, I'll dive, climb, fly the arc and haul her out. We'll pull a lot of Gs at the beginning and the end."

At 4:40 p.m. we were at 20,000 feet, boring through the Texas sky at 400 knots. Herb nosed her over. The sky disappeared upward and the F-94 dropped like a streamlined stone. Then, before I was ready, he hauled back on the stick. It felt like someone was piling Sequoia logs on my shoulders, my back, my head. Then, from somewhere in the distance, I heard the afterburner cut in and I knew we were rocketing almost straight up.

"*Here we go!*" yelled Herb.

And I slipped into another world, a world of delicately blurred sights and sounds. The cockpit was pleasantly hazy, the roar of the engine agreeably muffled.

I noticed that my feet were off the floor and that my body was floating upward ever so lightly against the seat belt. I was on a real champagne kick. Man,

I thought, don't let it ever end . . . and a pile driver smashed me down into the seat. We had indeed pulled a lot of Gs as Herb brought us back level.

When I came back up for air, I said, "How long were we weightless?"

"That was a shorty," he said. "About 25 seconds."

I knew then that while we were weightless I had lost my sense of time. I felt the way you do when you're just about to drop off to sleep and you come back to full consciousness with a start.

The next one was as pleasant as the first. I was floating, and everything inside me was floating. I was happy as a kid on Christmas morning.

I laid my pencil on the palm of my hand and gently let it go. The pencil floated away. I laughed and reached for it, but my weightless arm overshot. Accidentally, my fingers brushed the pencil, but it did not fall. I felt as though I had made a great discovery. I wanted to catch the pencil and throw it up in the air and yell with joy . . . when the pile driver hit me again.

"That one was better," said Herb. "About 35 seconds."

"Let's go for the record," I said. "I've got to get serious and do some work. I've got to act like a spaceman."

My watch read 4:58 just before we went down again. During this parabola, I closed my eyes. I was on the same kick, everything light and happy, but suddenly I felt as though I were rising out of my seat. I opened my eyes quickly, fearful that my harness had slipped loose, but it was still there.

I closed my eyes and drifted slowly upward once again. This time, I kept them closed and began a gentle forward somersault. Up and over I drifted until I opened my eyes and all the parts of the world scrambled back into their proper places. Sleep on a spaceship, at least for me, will be a long tumbling ride through nothingness.

"Pretty good that time," said Herb. "Almost 40 seconds."

"Do you feel these strange sensations?"

"Not too much. When you're busy, you don't have time to notice. And watching the instruments keeps you oriented."

We augered down toward Randolph, bucking and skidding as the dive brakes fought to keep us from plunging straight in. At 3,000 feet we leveled off, and Herb popped the wing flaps. In seconds the F-94 was tamed and we were sitting down

hard but smoothly on the long east runway, with our brake chute billowing behind us. I glanced at my watch again—5:17. It seemed to me that a lot had happened in one hour.

Back at Dr. Gerathewohl's office, I talked to Dr. Julian Ward. "What's the big problem," I said, "if you can find space pilots who get a bang out of this the way I did?"

He told me that being weightless for days or weeks may be quite different from being weightless less than a minute. What's more, the medics don't know yet how zero gravity will affect the heart and other large organs or the blood pressure. They are concerned about the effect on our reflexes.

Drop a cat upside down on the ground and he'll land on his feet. After 15 seconds of weightlessness, he can't do it.

Most researchers believe that a carefully selected, well-trained crew will not become airsick in space. Only about one out of three subjects gets violently sick in the F-94, and some doctors link their sickness with the sudden change from high positive G to weightlessness.

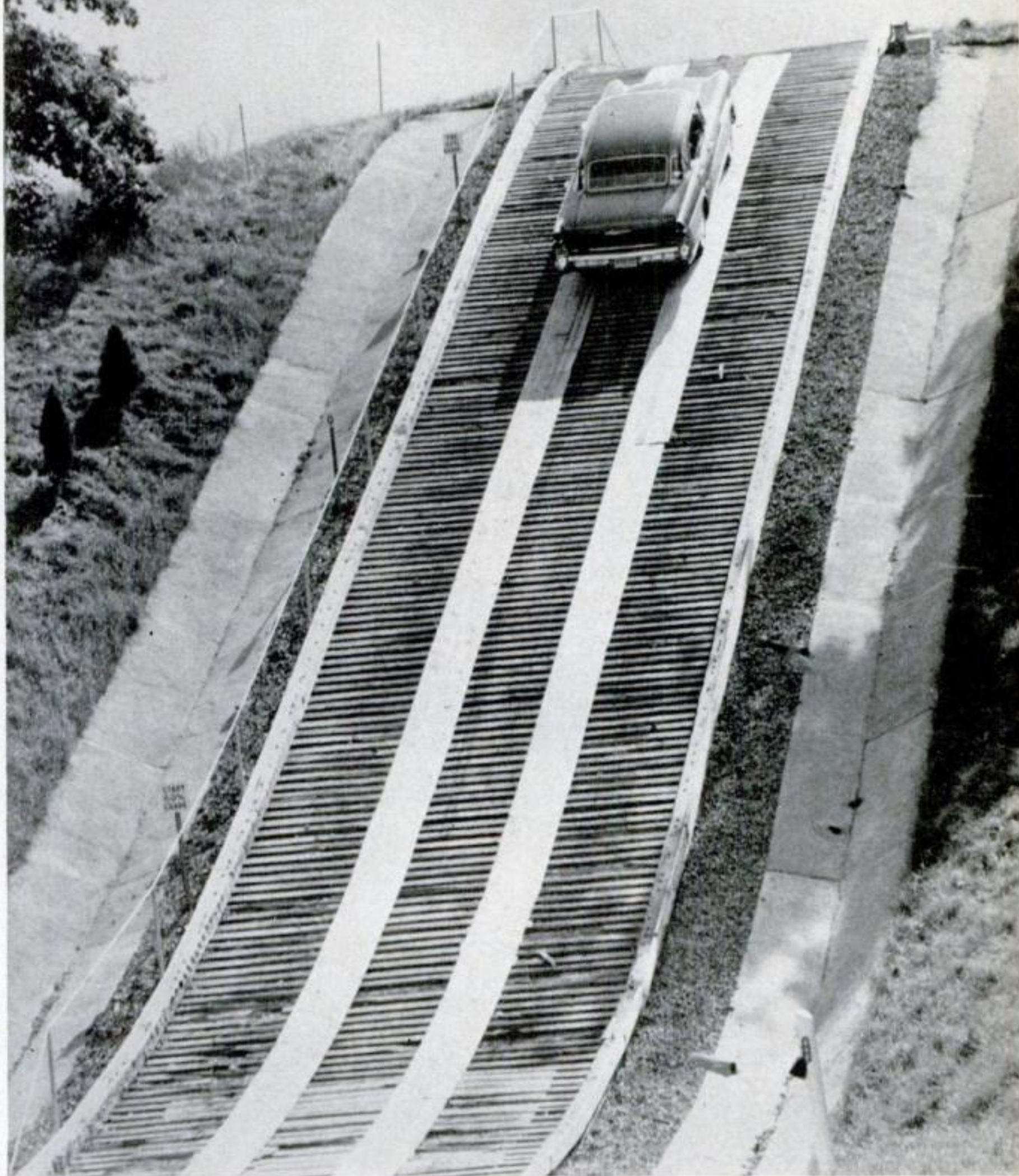
But the researchers are worried about the effect of zero gravity on coordination and muscular control. Most subjects aim too high if they reach for something. Vision is affected; the after-image of a light on the retina tends to drift upward during weightlessness. Eating and drinking are difficult. Sleeping may be a long nightmare. These are just some of the problems to be solved before we can put a man safely into space. **END**



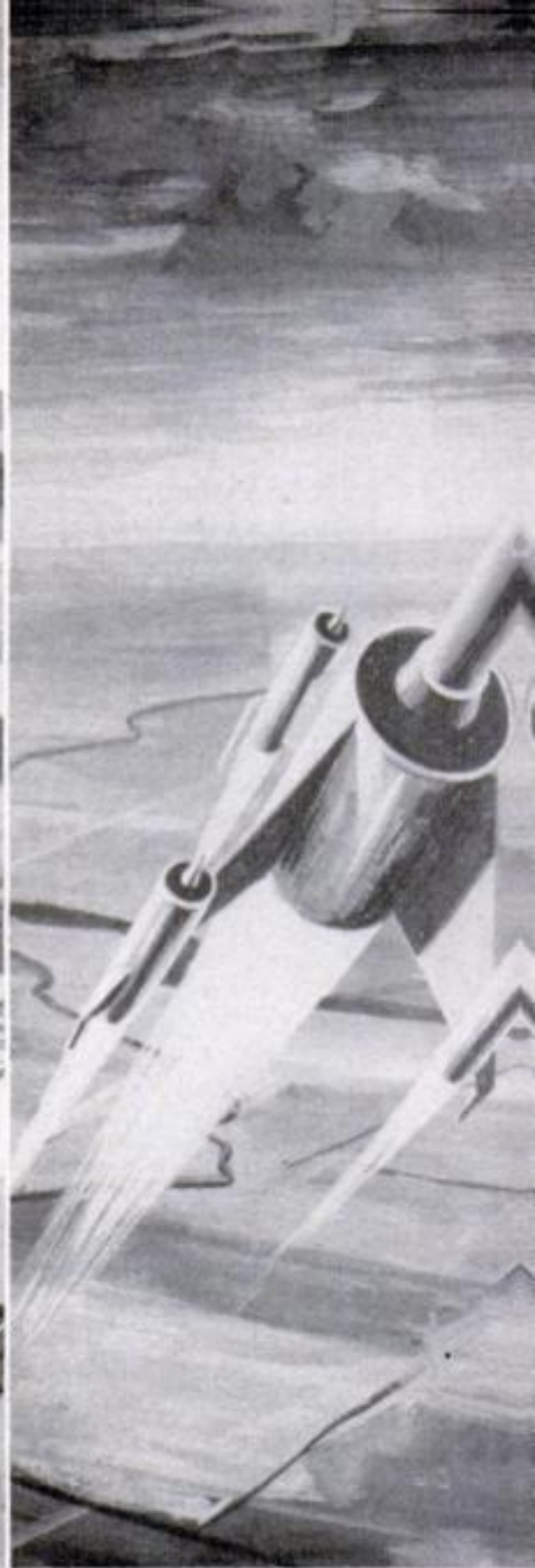
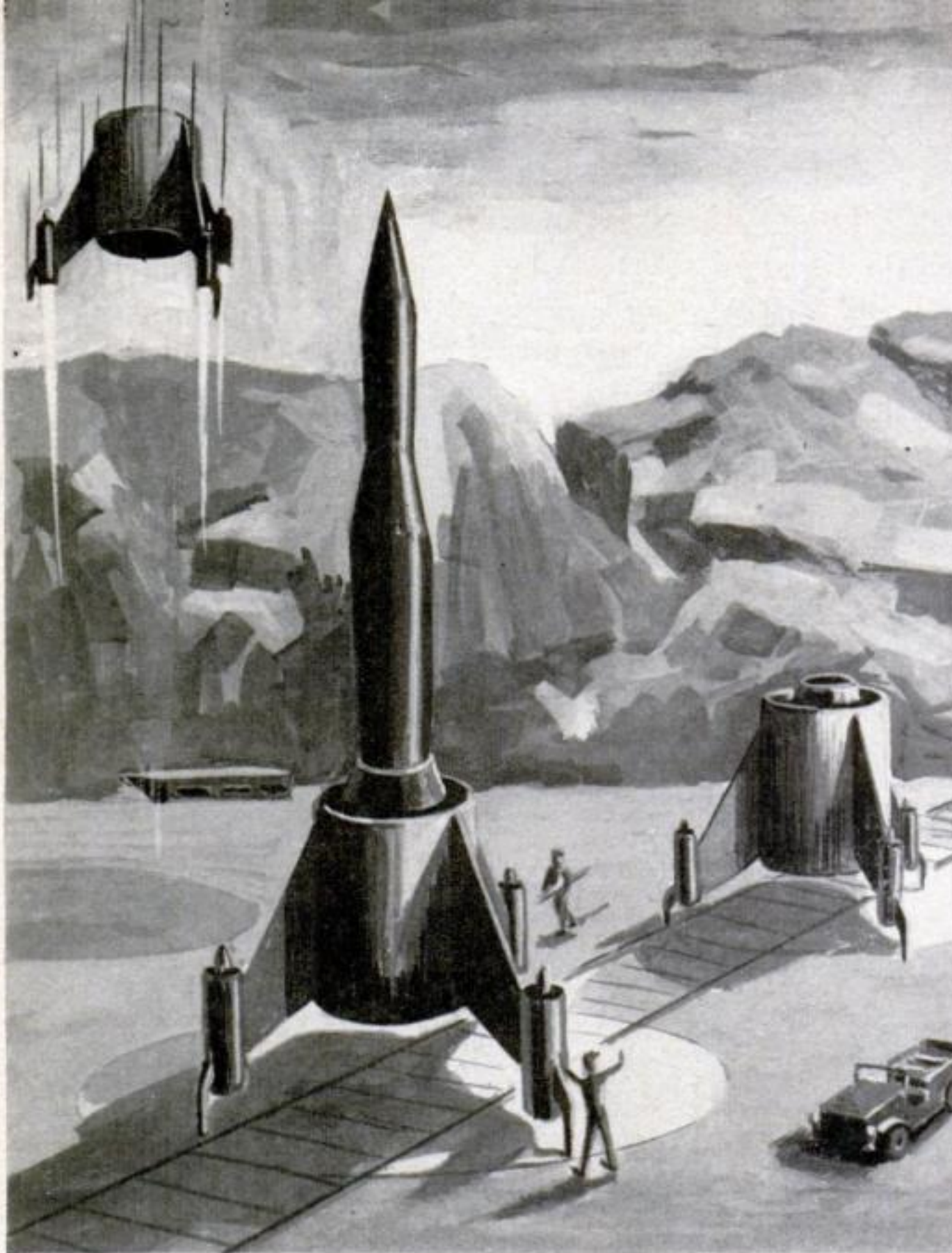
SPACE SPECIALIST Dr. Siegfried Gerathewohl—with the kitten who is helping expand man's knowledge of gravity.

Picture News

IN THE WORLD OF SCIENCE



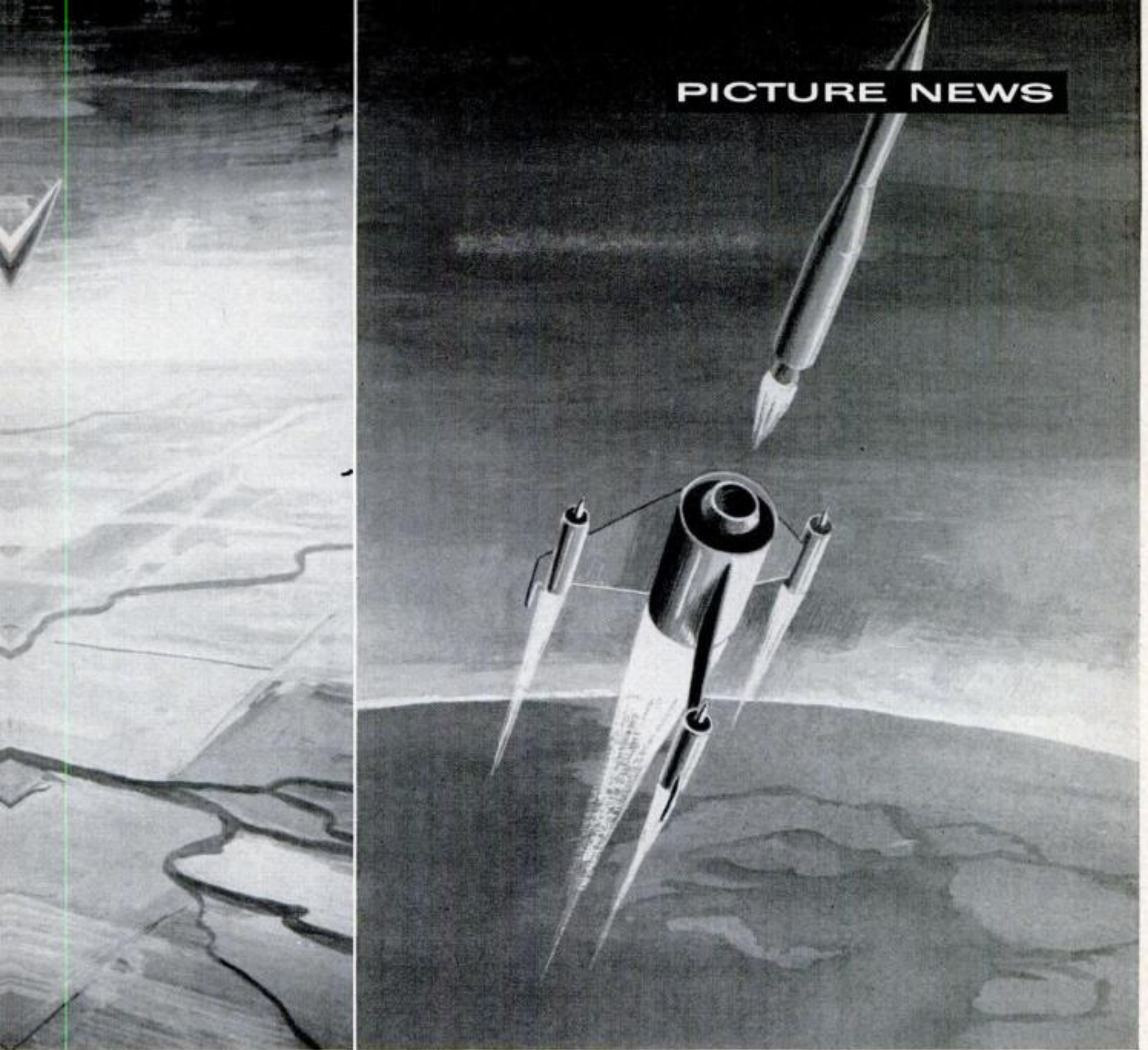
Car makes rugged climb. This incline, too steep for an unaided human climber, fails to stop a 1957 Buick Century. Built at the General Motors Proving Ground to test the climbing ability of military tanks, it has a 60-percent grade, or a 60-foot rise in 100 horizontal feet. A man had to cling to a rope to get to the top. San Francisco's steepest hill has a 31-percent grade; ski runs are seldom more than 45 percent. The Buick was powered by a 300-hp. engine and had Dynaflo transmission.



Jets to aid rocket launching? An ingenious new way to kick off missiles and space vehicles has been proposed by General Electric engineers. Jet engines, in effect a new first stage, would boost a missile up many thousands of feet before the missile's own rocket engines began

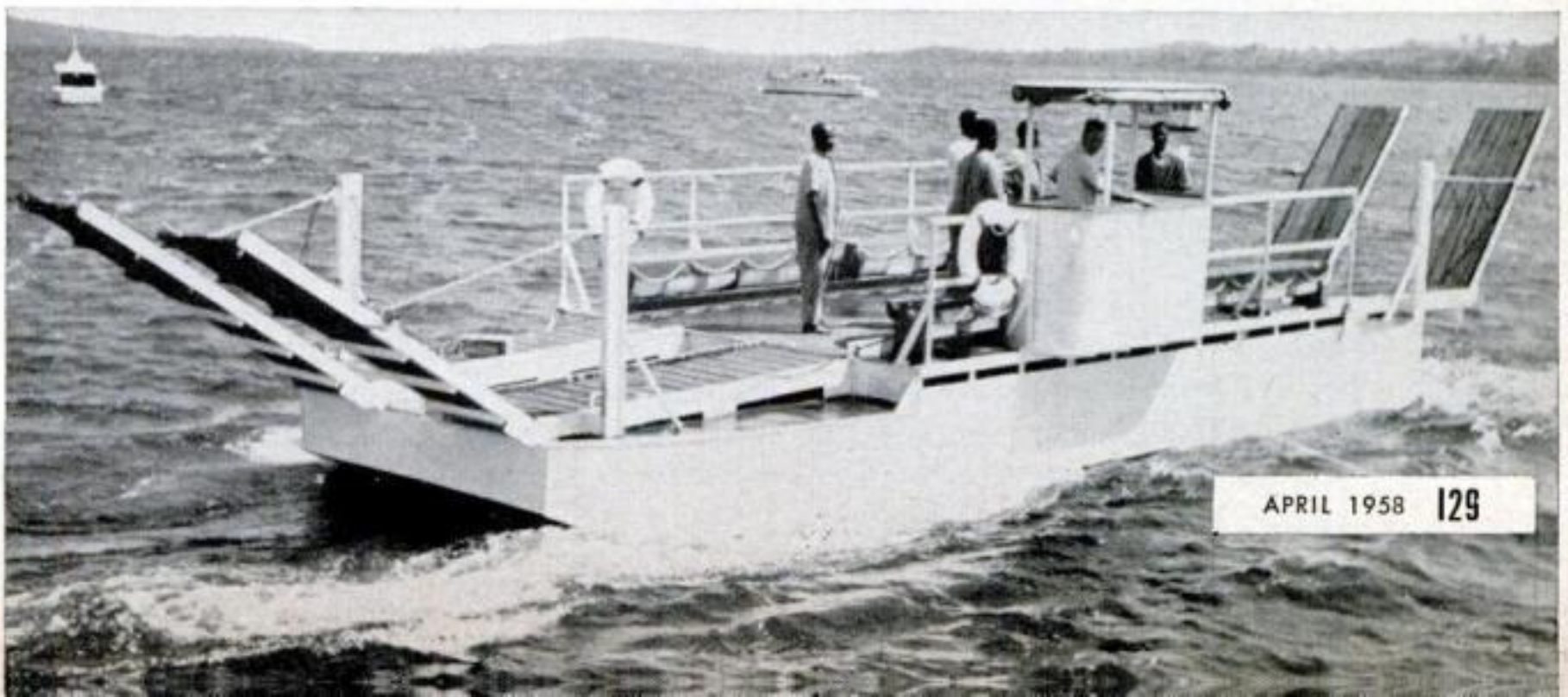
Rail car transports molten metal. This odd-shaped tank car slung between two pairs of three-axle trucks is used by the French State Railways to haul liquid pig iron from blast furnaces to steelworks in the Ruhr. It picks up its load at several smelting plants, rotates to discharge it through the opening at top. German made, it can hold 150 tons.





firing. Efficiency would increase because the jets, being air-breathing, wouldn't have to carry their own oxidizer. Other advantages claimed: The jets would be recoverable, and launching sites could be simpler. Shown above are three phases of the launching operation.

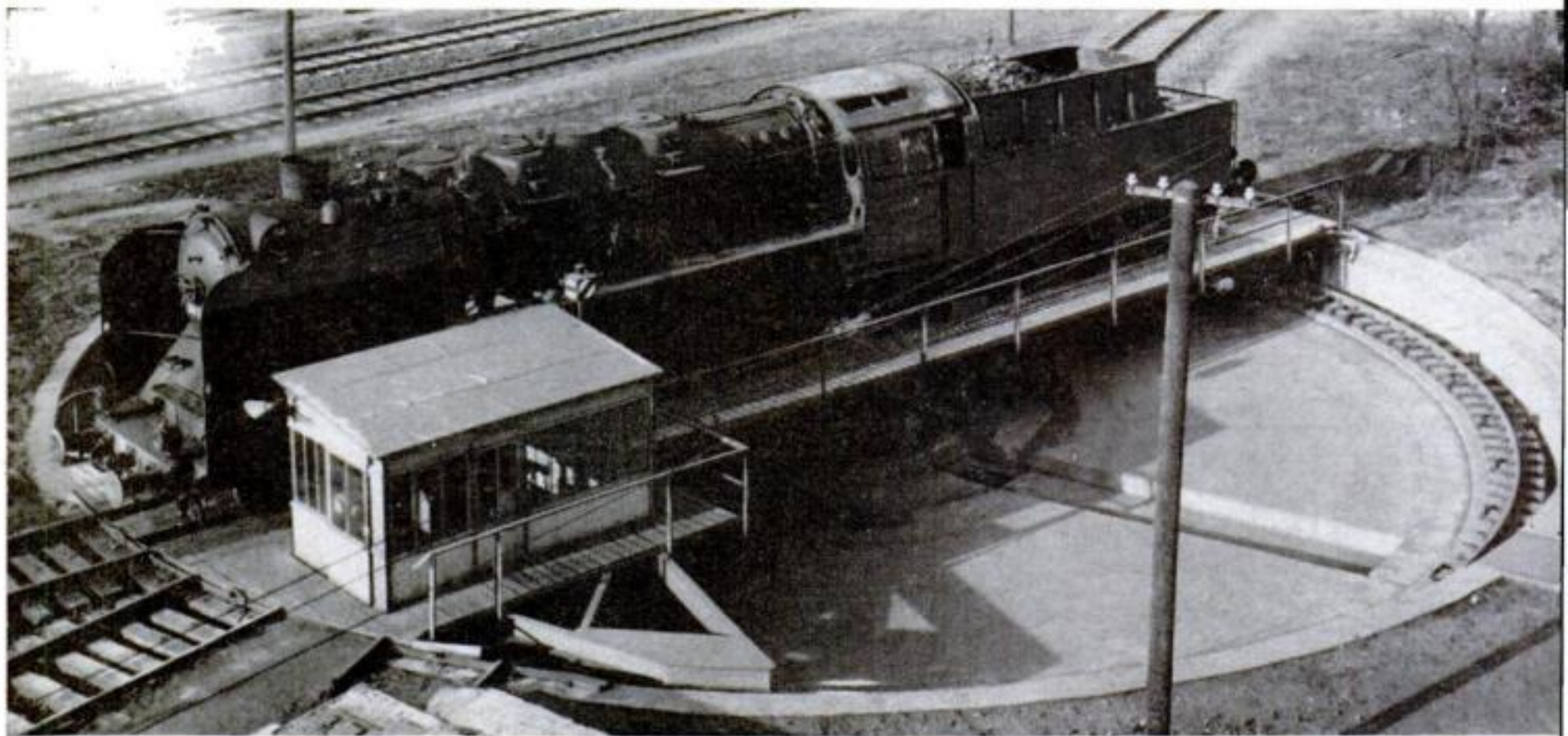
Ferry rides on water jets. No propeller or rudder is needed on the craft below. It travels on water sucked in by diesel and shot through ports at bow and stern. Two levers operate valves controlling flow to port and starboard. With one forward and the other back, it turns on its axis. It is run in Uganda by unskilled African crews, can carry a 10-ton truck.



PICTURE NEWS



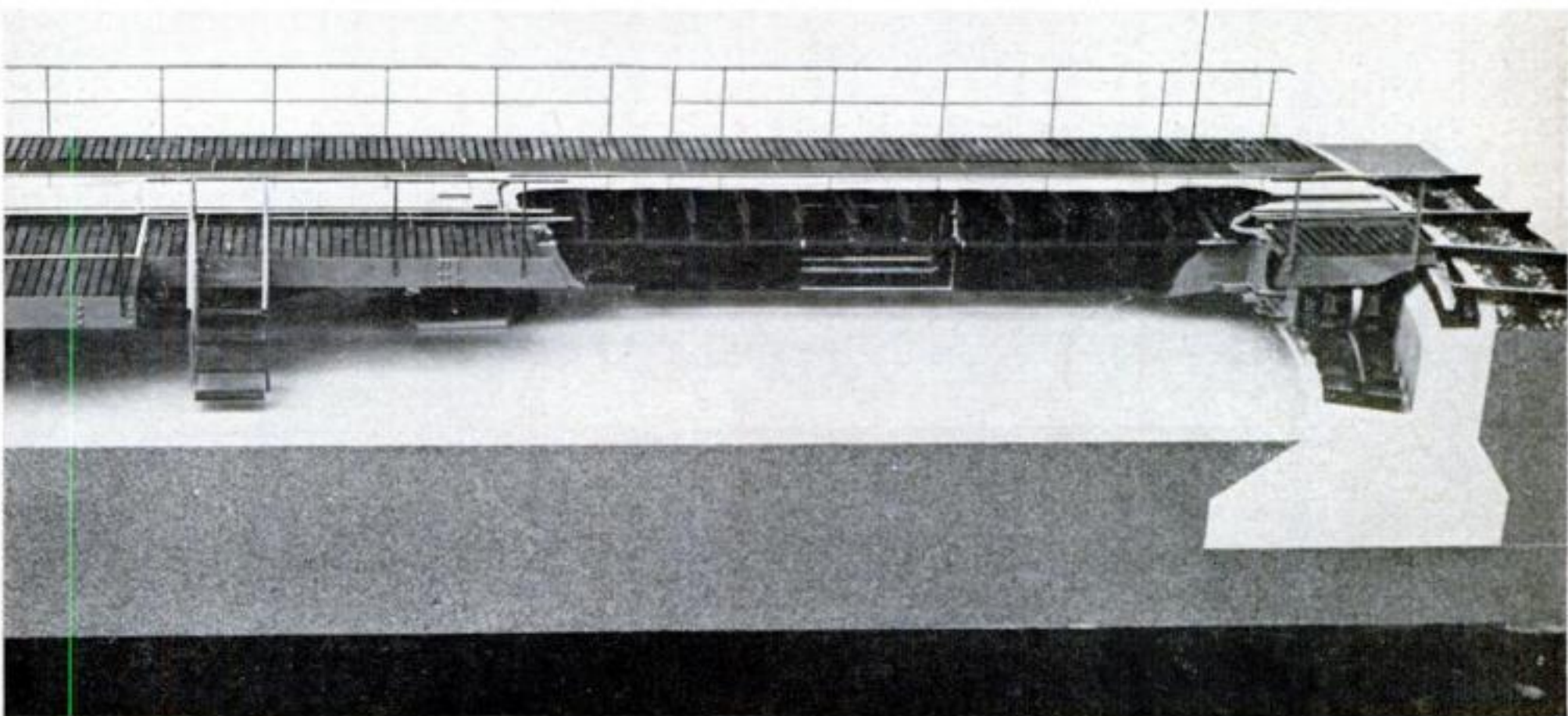
Plane carries passengers and cargo. Only airliner to have two full-length decks, the French Breguet Deux Ponts takes 59 passengers on the upper level and as much as four tons of cargo on the lower. With seats installed in the cargo compartment, it accommodates a total of 107 persons. The rear half of the upper deck can be removed to carry



Turntable built of tubular steel. When huge new locomotives were put in operation by the German Federal Railroad, they were found to be too heavy for the old-style turntables. Instead of strengthening those in service to take the extra loads, the railroad built new ones of



such bulky freight as military tanks. On its initial transatlantic flight to New York, the one above brought over two new 1958 eight-cylinder Simca Vedette Chambord cars. One is shown being unloaded by rear ramp at the lower right. The new Breguet, in Air France service, is powered by four Pratt and Whitney R-2800 engines and cruises at 230 m.p.h.



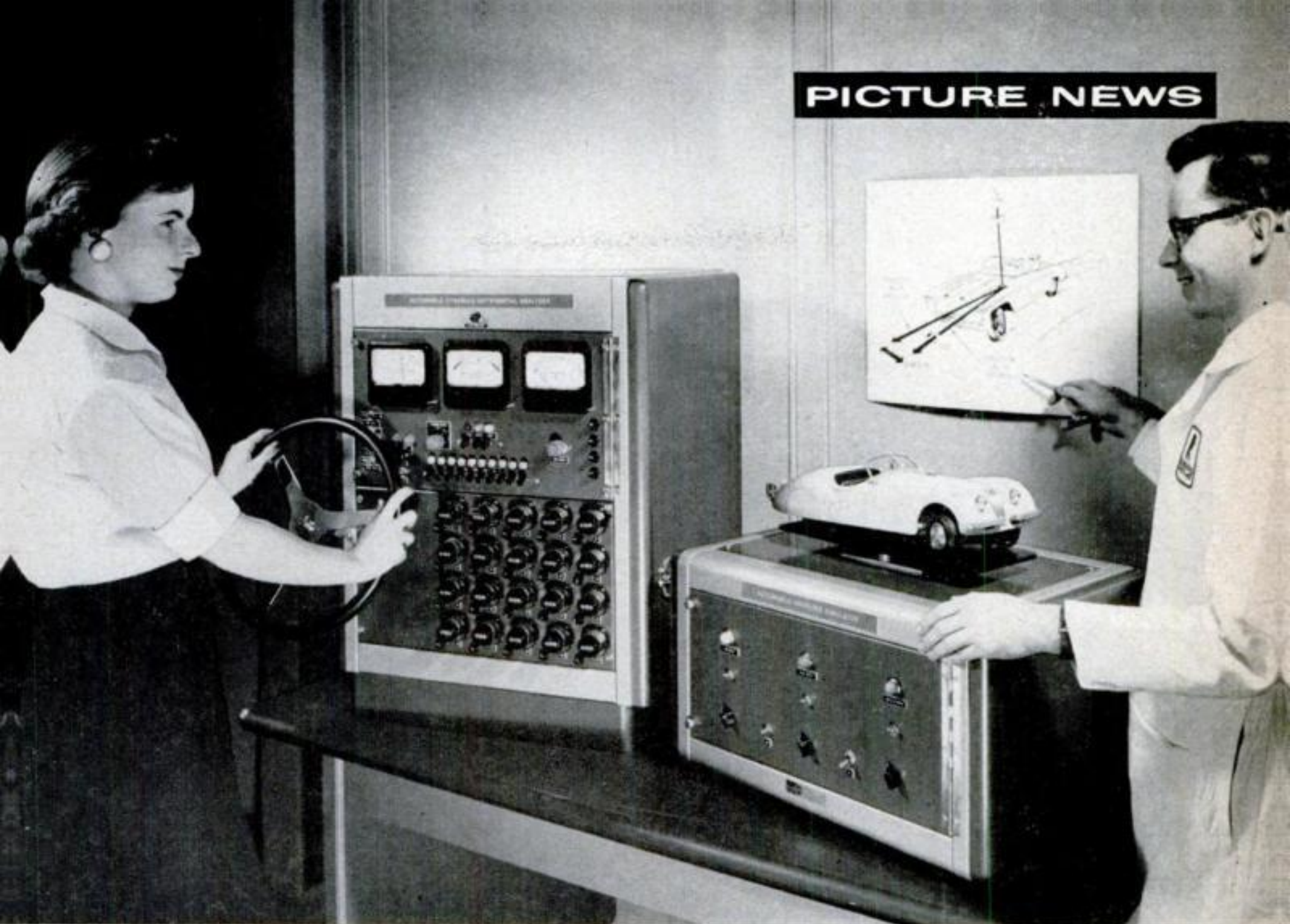
tubular-steel cross members. They carry more weight with a shallower draft of the bridge, thus lessening pit depth, and are cheaper to build. Above is a cutaway model showing the tubular-steel construction. At left is a big German 4-6-2 express locomotive on one of the new turntables.



Giant hand guides youthful pitchers. To teach thousands of boys at a time how to hold a baseball for various pitches, Bill Veeck, former club owner, uses this six-foot rubber hand and three-foot ball. Articulated fingers show grips, the ball swivels. Here Veeck demonstrates at Yankee spring training camp with Casey Stengel, manager, at his side.

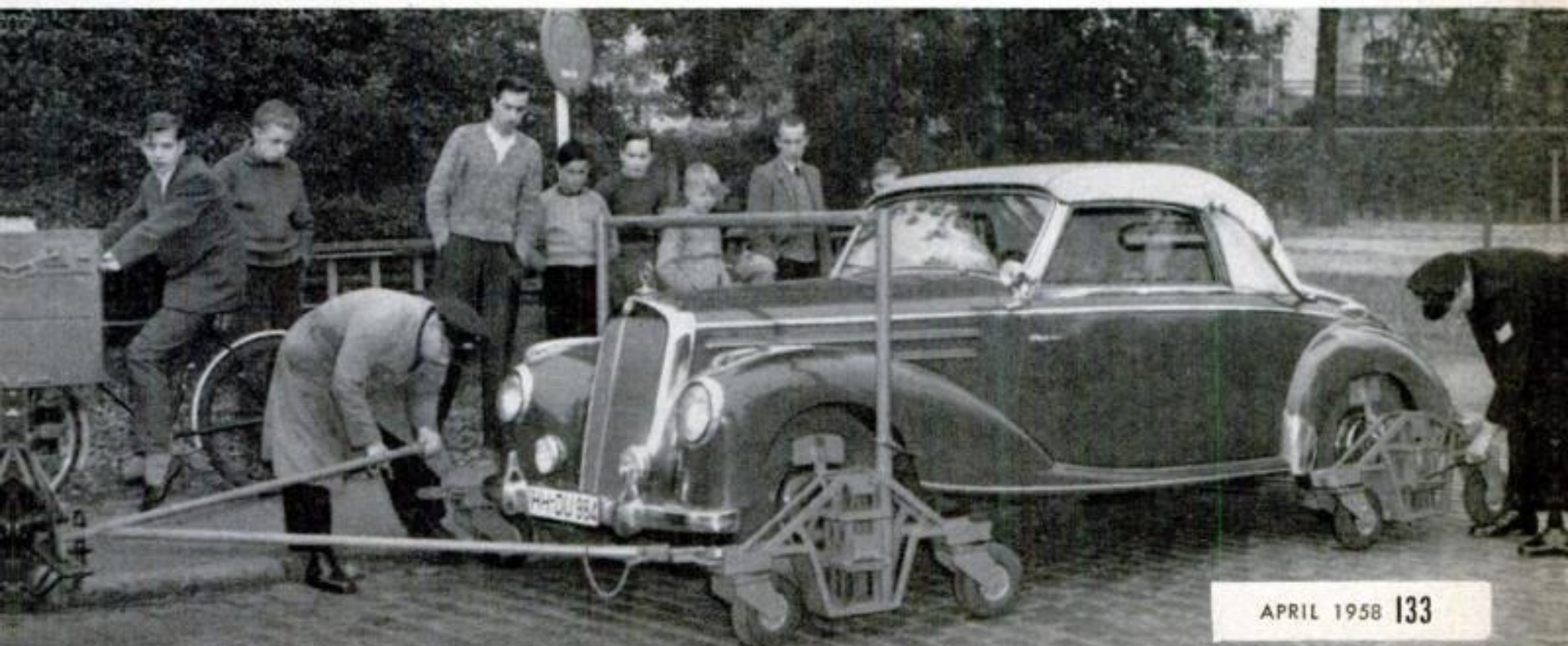
Bat-wing filling station. The hyperbolic paraboloid roof of the new service station below in Wichita, Kan., adopts extreme modern design for utilitarian building construction. The 40-foot-square roof was put up first on pillars and walls added under it. Major advantage of the shape is great strength at light weight. The one shown is but three inches thick.





Computer solves steering problems. Using a wheel linked through an analog computer with a miniature car standing on a "handling" simulator, General Motors research engineers above study stability and control of an automobile still in the design stage. Servo mechanisms in the simulator respond to turns of the wheel as a car would on the road.

For illegal parkers. Police in Hamburg, Germany, now have easy-to-use equipment for towing off cars left in no-parking zones. It consists of four rubber-tired two-wheel dollies that can be attached in a few minutes to the jacked-up wheels of an illegally parked automobile. Officers no longer have to force open a car to release brakes or disengage gears.





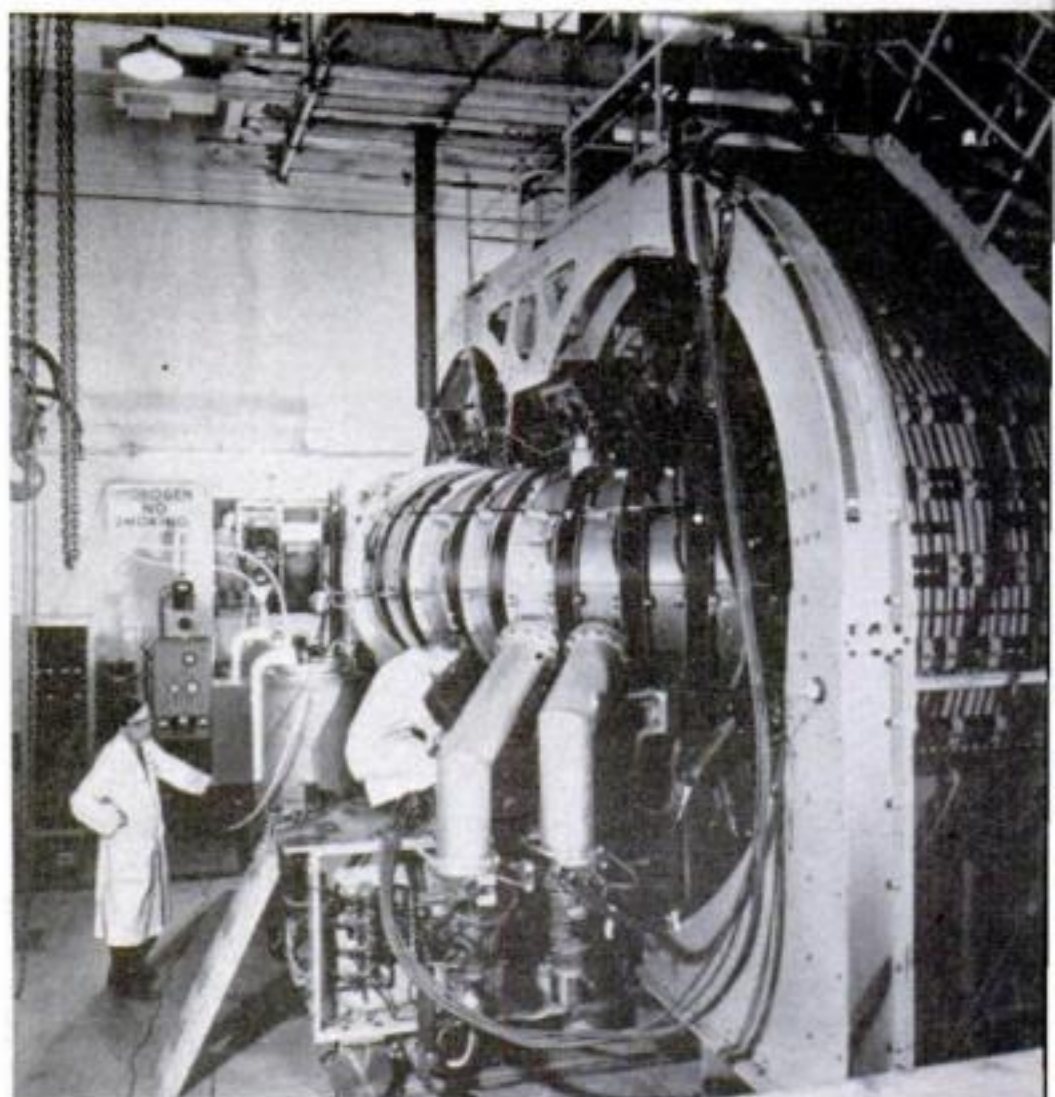
ELECTRIC DISCHARGE of this ring of big condensers gives 1,000,000-ampere current and sunlike

heat in Los Alamos' straight four-by-12-inch Columbus II tube (unseen in photo) below center.

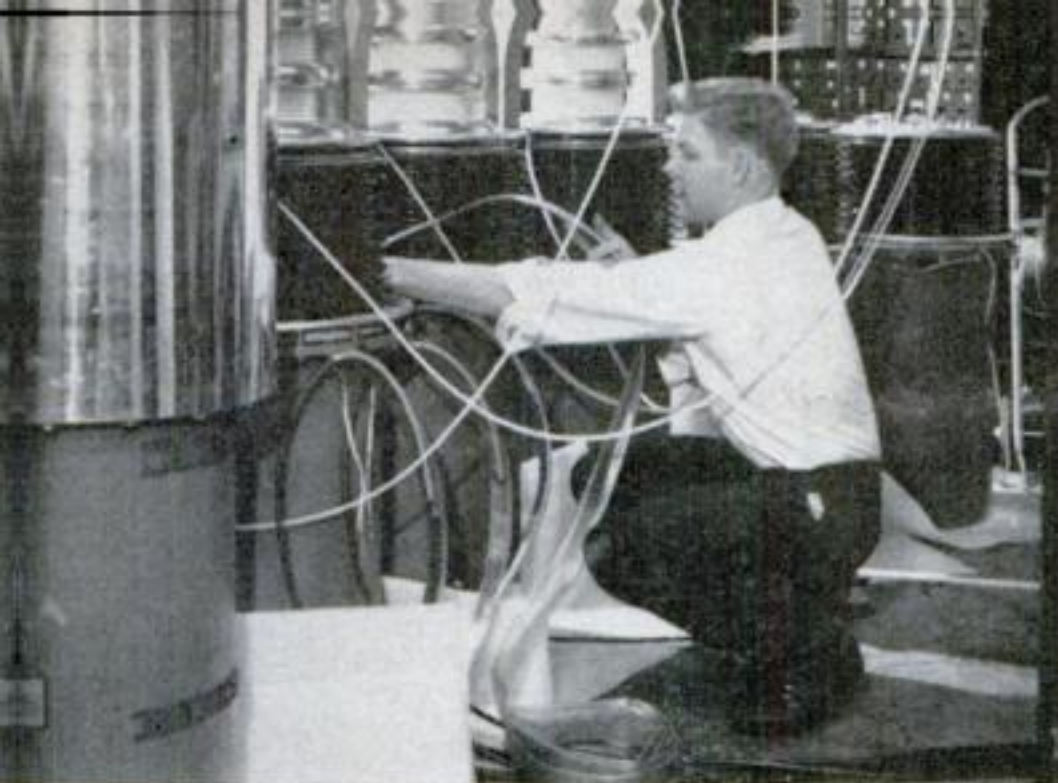
Bottled suns. Newly unveiled are these latest atomic-fusion machines at our Los Alamos Scientific Laboratory, and a giant British one called Zeta—along with their feats up to now.

All are “magnetic bottles” for thermonuclear experiments that may harness the multimillion-degree reaction of the H-bomb for power (PS, Feb., '58). The magnetic effect of a heavy electric current, induced in a tubeful of gas, compresses and heats the gas—and holds it away from the tube's wall, to keep the apparatus from melting.

With lightning-like currents of up to 1,000,000 amperes, the modest-sized U. S. tubes have set a 10,800,000-degree-F. record. England's huge Zeta, initially wielding 200,000 amperes, holds almost-as-high temperatures much longer in its great aluminum tube of 3¼-foot bore and 10-foot diameter. The first big-scale U. S. fusion machine, the Model C Stellarator, will be ready within two years.



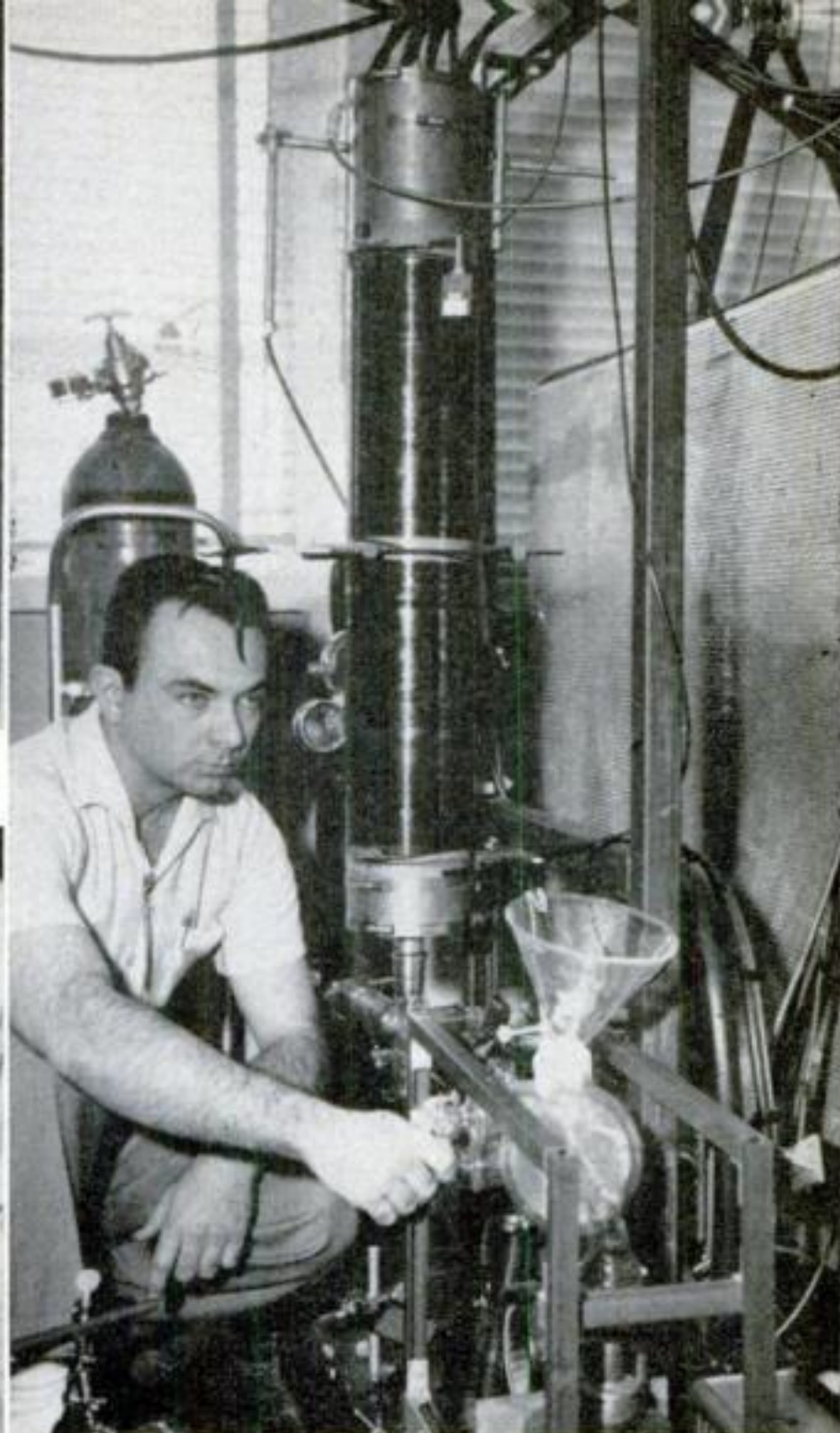
First big-scale H-machine: England's Zeta.



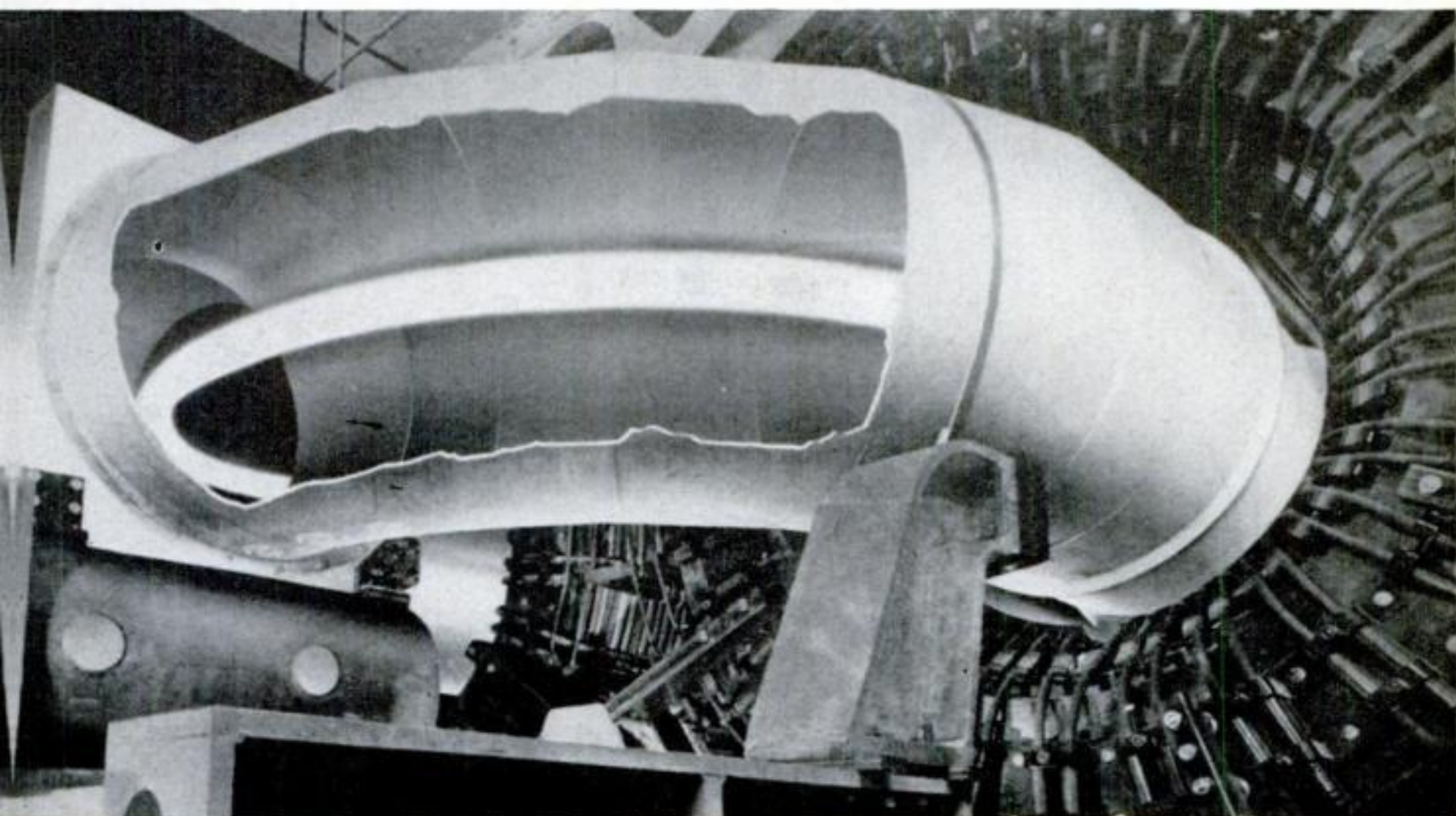
SPARK-GAP TESTS solve problems of switching huge electric power from condensers into tubes.



DOUGHNUT-SHAPED PERHAPSATRON TUBE momentarily yields record of 10,800,000 degrees.



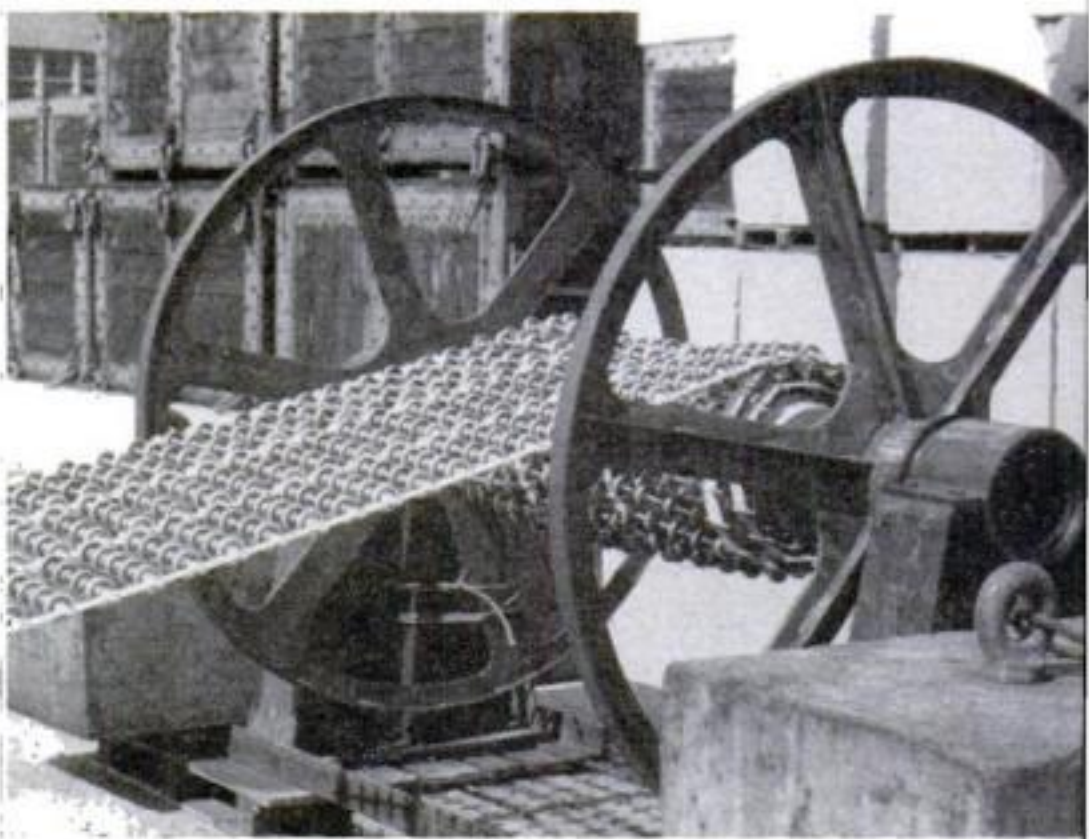
LARGEST U. S. FUSION TUBE publicly shown is five-by-24-inch Columbus S-4, made of porcelain.



This photo-diagram of Zeta's giant tube shows its hot gas (white ring) pinched to center.



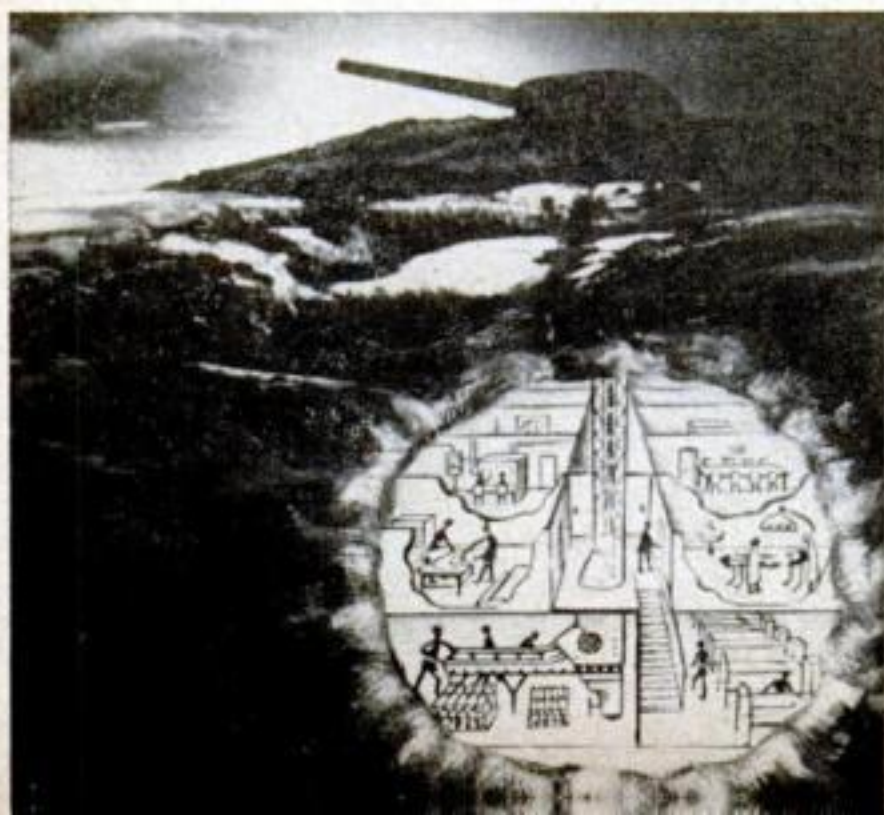
Tilting bed unloads fast. A big boxcar rolled onto this platform and locked in place is tipped in three directions to be emptied of 2,000 bushels of grain in $4\frac{1}{2}$ minutes. The device at right forces open the door when the car is tilted, first at one angle then to the other, to let grain pour from both ends. Then a baffle is inserted and the platform tipped 40 degrees to unload the car completely. Two of these tilters were built by Link-Belt Company for Chicago elevators. Each can handle 10 cars an hour.



Sea-borne conveyor gets dry-land test. This flexible gravity belt is equipped with skate wheels for transfer of cargo at sea between ships with a difference in deck heights, such as from a supply ship to a destroyer. Shown here in a shore test at the Naval Supply Research and Development Facility, Bayonne, N. J., it is made of four strips of nylon webbing slotted for axles carrying a number of small nylon wheels. Action of the wheels tends to center the cargo. At right is a reel for stowage.



Man-made canyon. This huge cut—200 feet deep and 725 feet long—was dug through a mountain to channel water to the powerhouse of the Swift hydroelectric project on the Lewis River at Cougar, Wash. More than a million cubic yards of rock and earth were removed by scores of shovels during excavation for the new river bed. At this point wire mesh covers the steep sides to protect workers from slides and falling rocks while trucks use the muddy floor for a highway before the water is let in.



Ready for atomic war. The strategy of military leaders in Sweden is to dig deep in preparation for the next conflict.

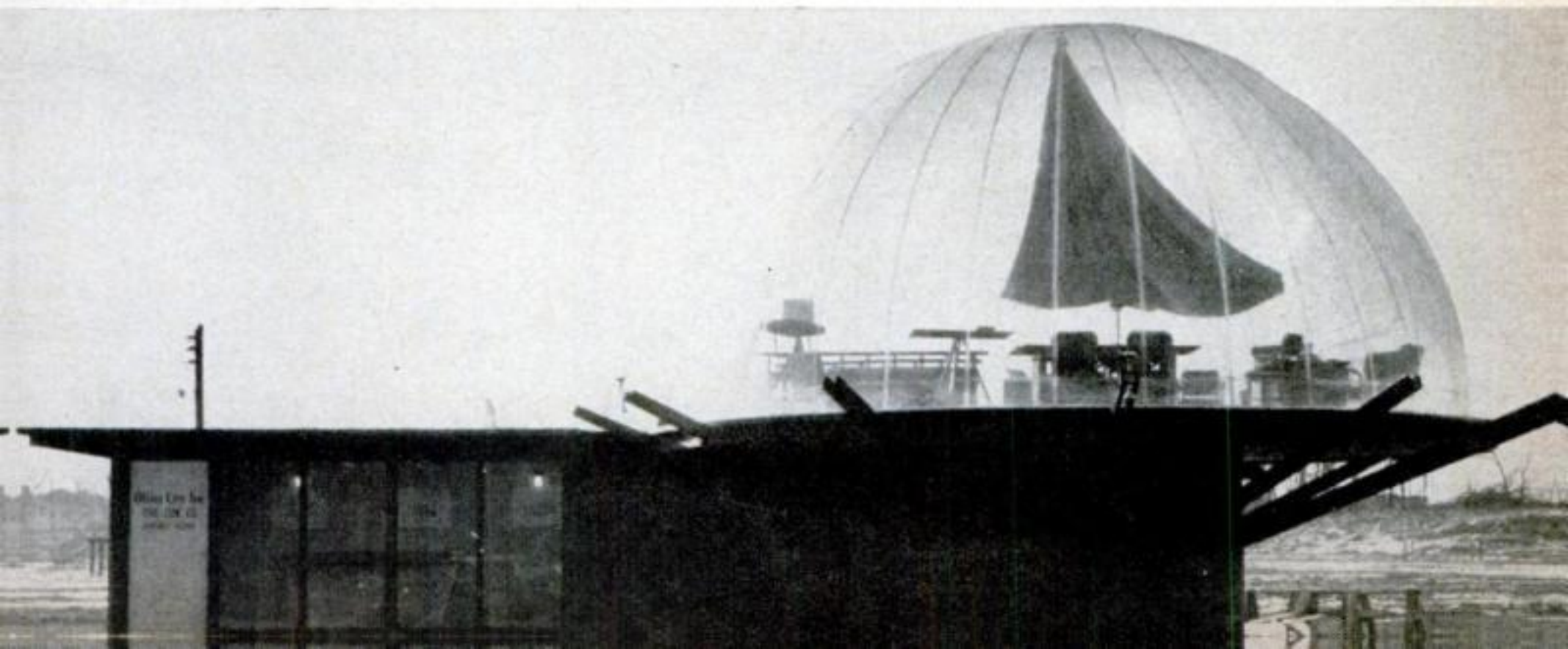
Above a warship rides at its mooring inside an underground base from which the navy would operate hit-and-run raids.

At left is a diagram of a coast-artillery battery in which nothing but the gun is exposed. Living quarters, ammunition, fire-control centers and hospital facilities are buried far down below in the granite cliff.



Fuel train rolls on huge wheels. Ten tire-like rubber containers, each holding 500 gallons, are being pulled over rough ground by an Army Teracruzer. Mounted on special axles developed by Four Wheel Drive Auto Co., these five-foot-high Goodyear Rolli-Tankers haul fuel in quantity in sand, mud, swamp, ice and snow. The axles include a braking system and equipment that fills "tires" at up to 100 gallons a minute.

See-through air house. This new office building in a Minneapolis suburb is topped by an inflated bubble made of DuPont transparent plastic. Interior pressure is maintained by a small fan and airlock doors. The sail-like object hanging on the inside is a plastic shade to ward off hot sun. G. T. Schjeldahl Co. of Northfield, Minn., designed the structure.



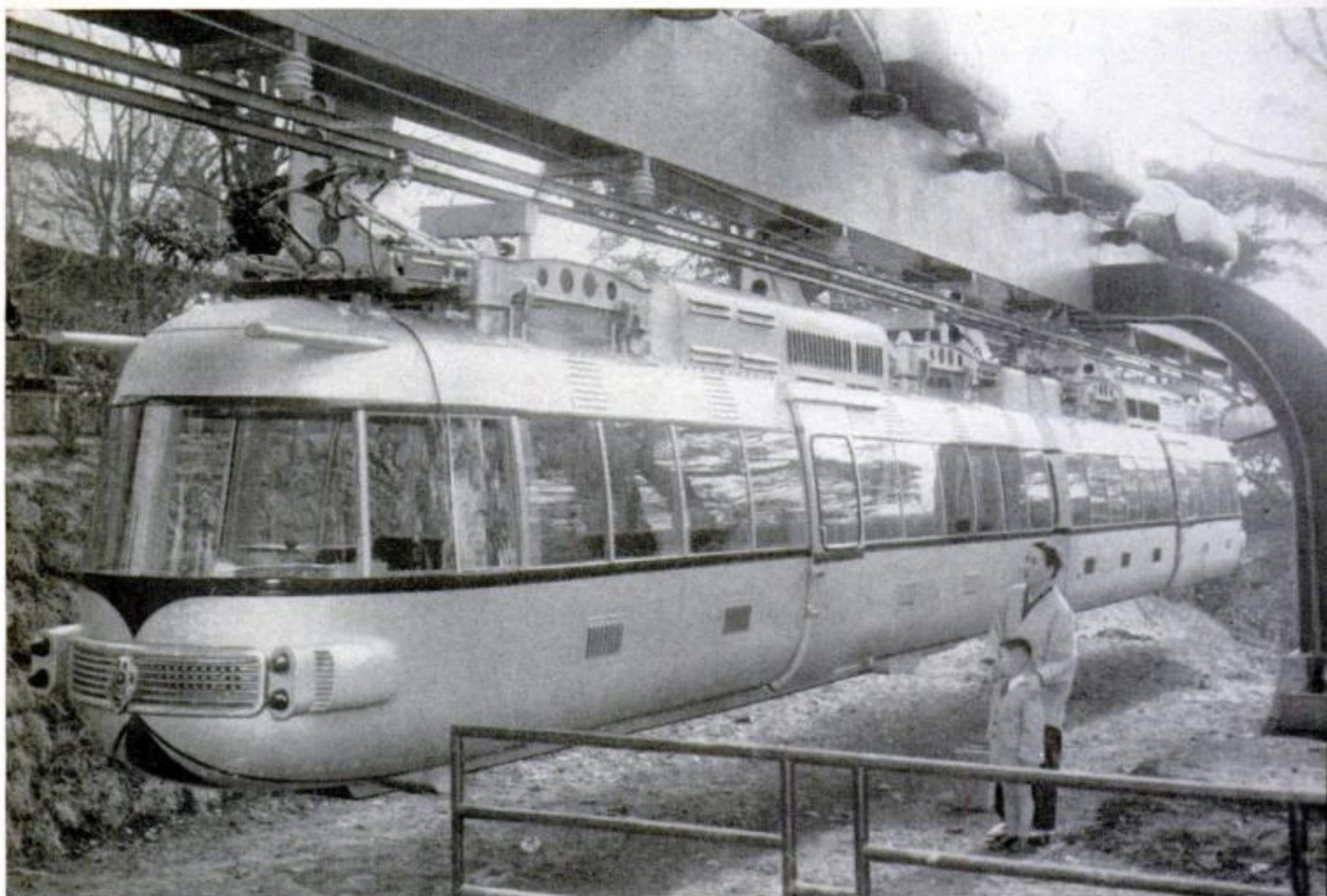


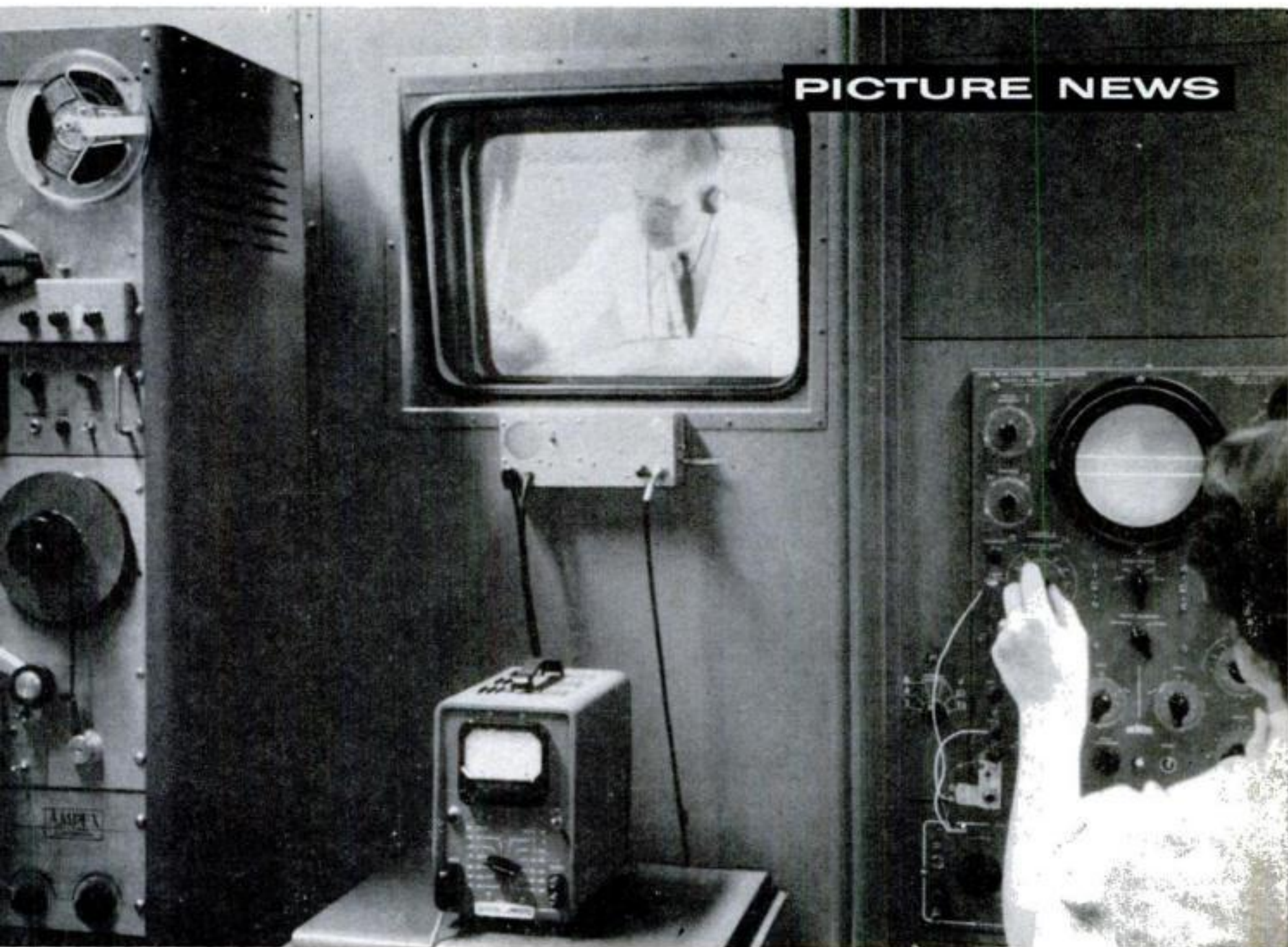
Picnic car. Built into the trunk of this new British luxury auto, the Bentley Countryman, are a complete table and equipment for roadside meals. Also mounted in the compartment are a wash-bowl and mirror for washing or shaving.



Radar surveyor. The device above, a Tellurometer, cuts to an hour a surveying job that takes a 10-man transit party three weeks. Two transmit waves between them to measure distance. Developed in South Africa, it is also used in the U. S.

Monorail: Japanese style. This two-coach electric train riding a single overhead track is Tokyo's first experiment with monorails. It runs in one of the big parks; if successful, others will be put up over the city to help relieve traffic congestion. It operates on rubber wheels rolling in boxes above the rail. Small side wheels keep them from running off.





Engine-pressure pickup used on heart. An instrument called a capacitance pickup, first developed to determine auto-engine pressure, has been adapted by General Motors, with the help of a doctor, for use on human hearts. In a soundproof room (in window above), it detects even the slightest heart murmurs and records them as electrical signals.

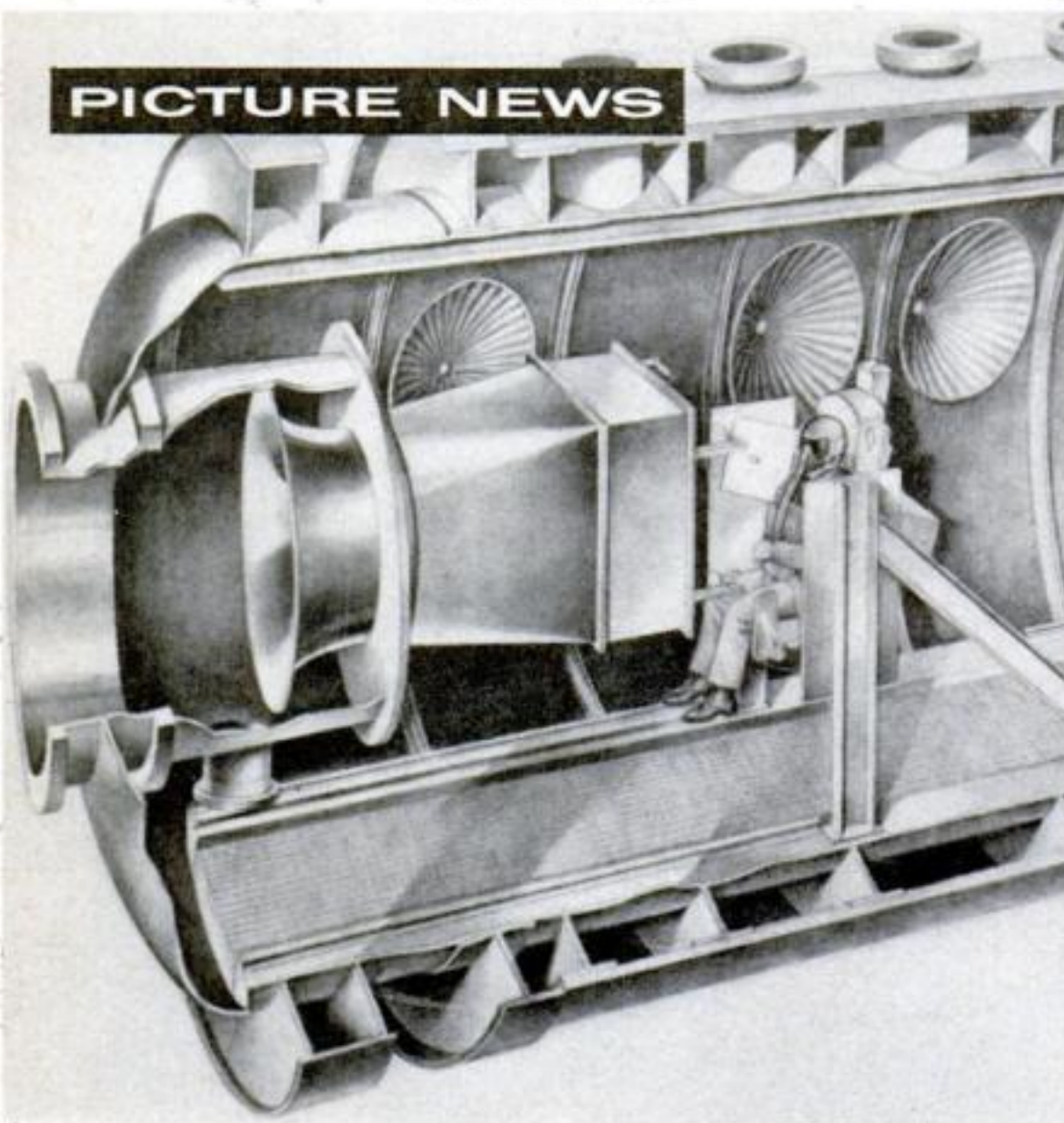


Canopied transport. To keep sandstorms from marring paint on new cars, two-deck, covered auto transports are being used on Detroit-West Coast routes. A winch raises and lowers the top deck.

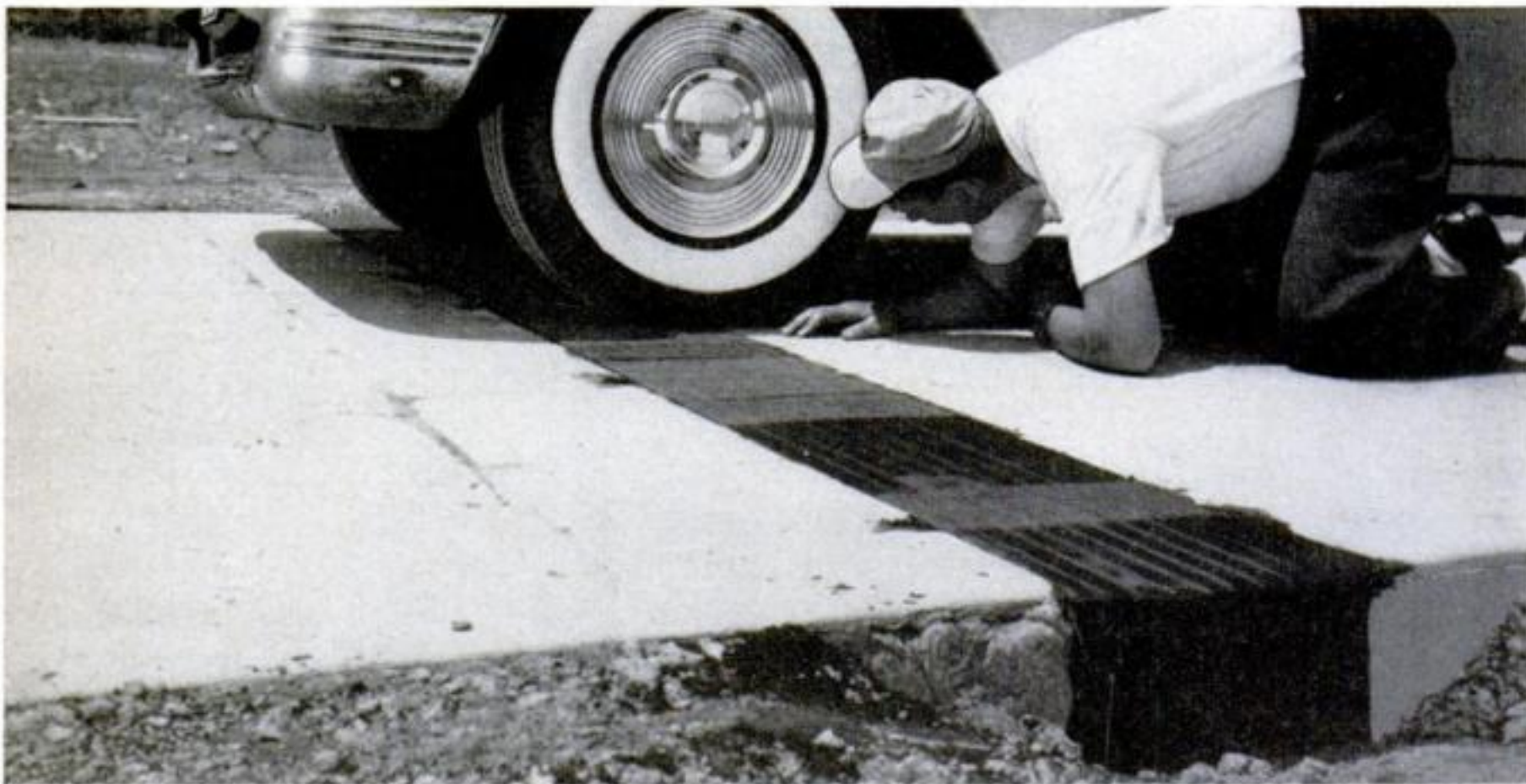


Jackknifing dinghy. This little boat folds in the middle to be towed along behind a car on one detachable wheel. It can also be loaded with luggage. The hinge is waterproofed, locks in water.

PICTURE NEWS

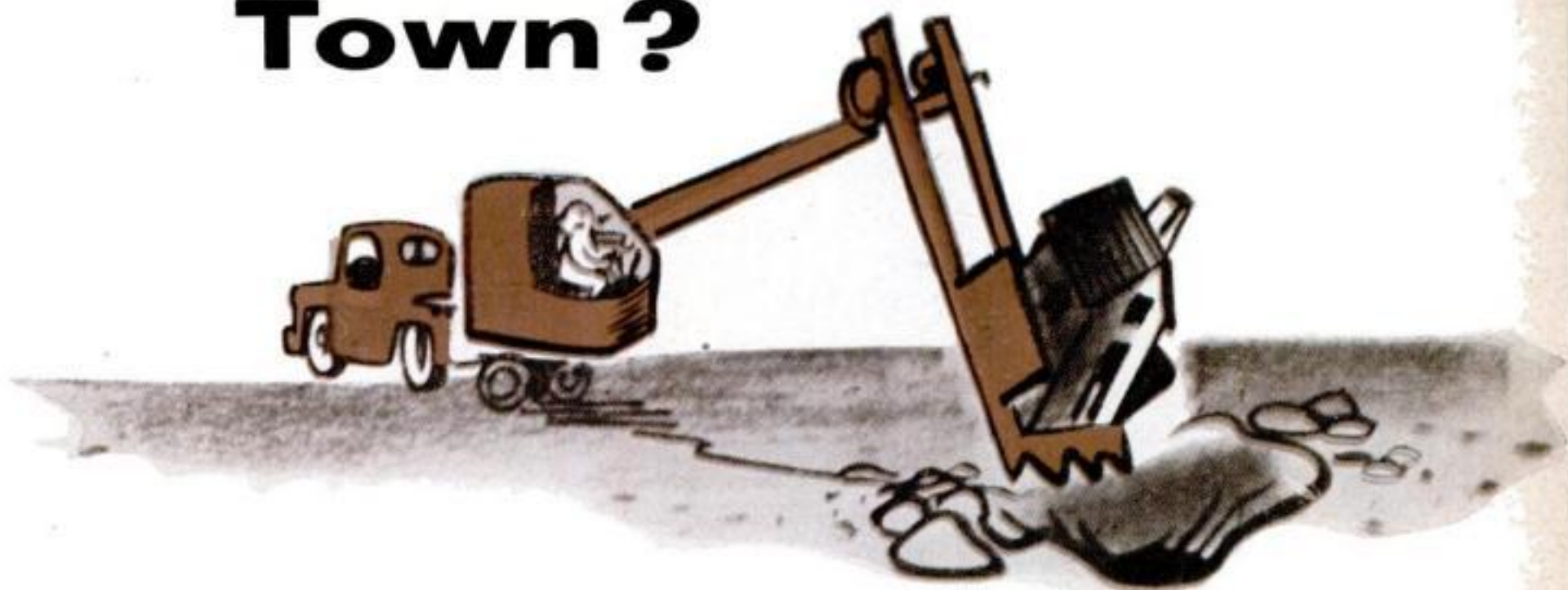


Supersonic ejection. A special seat, tilting (right) at various angles during phases of ejection, was built in a wind tunnel for the first time to try out this flying suit. It provides closer observation and control than rocket-sled tests. Martin engineers designed the suit with an oxygen mask and other parts that won't rip off during high-speed ejection.



Rubber road link. An expansion joint of special synthetic rubber is being made by Goodrich for experimental highways and runways. Consisting of spaced strips that absorb expansion and contraction of concrete slabs, it stays flush with the surface and provides a smoother ride.

Will a Super-City Swallow Your Town?



Our cities are spreading out, soaking up the suburbs. By 1975 three-fifths of us may be living in a new kind of community: Interurbia

By Guy Shipler Jr.

YOU may be a suburbanite today, but you'll be a city-dweller tomorrow—whether you like it or not. And you won't even have to move to do it.

For by 1975, the American suburb will no longer exist as a community with a specific identity. Instead, population experts now predict, it will be just one small section of a vast "city strip," which in some areas of the U. S. will stretch for hundreds of miles. Tomorrow your town's name will remain only as a tag for a small part of your particular super-city, just as today the name of the street you live on is a tag for a part of your suburb.

The reason for all this is that American cities are fast spreading toward each other, physically encompassing their suburbs. Your community will be a vital part of the merging of present-day Suburbia into a great social and economic community of the future which the experts call "Interurbia."

One study—under the combined efforts of J. Walter Thompson Co., an advertising agency; Yale University; and Fortune magazine—finds these broad changes which Interurbia will bring to your life:

By 1975, about 60 percent of the U. S. population (estimated at somewhere between 207 million and 228 million) will live on between four percent and five percent of the total U. S. land area.

This area will contain about 20 separate Interurbias, throughout the nation. They will be formed by present cities soaking up suburbs and open country between them, until



As people and industry sprawl out away from the central city, homes and jobs, once tied closely together and firmly fixed in their places, are becoming more movable

finally they merge into one enormous overall community.

Yet this doesn't mean you will have neighbors crowding into your back yard. You and they will both actually have more space—population per square mile will continue its long-range drop in urban areas. Example: In the New York area, population ran at 20,000 per square mile in 1940, will be only 11,000 by 1975. Reason: Greater mobility (super-

highways) will let Interurbias spread to wider boundaries. Thus, you and your neighbors will still enjoy the best elements of suburban life.

You can look forward to not only a bigger economy, but a more stable one. Reason: Your new neighbors, as metropolitan dwellers, own little property now. But when they move out from the central city, they will be

forced to buy property—a stabilizing factor.

You'll be best prepared for the invasion if you *expect* it: All this will happen much faster, the experts tell us, than any change the world has known. "A new dimension in our economy . . . is velocity," says the Thompson study. "We as a nation have failed to anticipate the *pace* of our growth."

Past errors in forecasting bear this out. In 1946, the Census Bureau predicted a U. S. population in 1955 of 150 million. It turned out to be 167 million. That 17-million miss adds up to more than Canada's entire population.

Also in 1946, auto economists said we would be driving 36 million cars on U. S. roads in 1955. Instead, the actual number ran to 52 million. These 16 million extra cars total more autos than exist in all of Western Europe.

What's going to catch up with your suburb is the fact that this velocity is due to increase with explosive force.

Many suburbanites have already seen such forecasts start to come true. The signs are especially clear in Los Angeles, where the suburb already has almost ceased to exist. The city itself, 455 square miles and two million population, is merely the core of an Interurbia—a vast complex of satellites, extending far beyond Los Angeles County. These areas add another 4,800 square miles, boost the total population to six million. The small communities making up this area are fast losing their individual identity as suburbs.

Actually, the whole pattern of city expansion has changed. Traditionally, it has been like fried eggs in a pan—the "yolks" were the central cities, the "whites" the surrounding suburbs. Each had its distinctive qualities. But as the eggs spread toward each other, and finally meet, the result is "scrambled eggs."

Thus all the elements of your life will be intermingled—your residence, your work, your play. Instead of commuting with your neighbors toward the central city in a one-way stream, you may go to work in the *opposite* direction. And because business and industry are already leapfrogging suburbs—with clean, modern plants and offices going up near residential areas—you may get to work in a quarter of the



A new dimension in our economy is velocity . . . what's going to catch up with your suburb is the fact that this velocity is going to increase with explosive force



Like fried eggs in a pan, the "yolks" were the central cities, the "whites" the surrounding suburbs. But as they spread toward each other, the result is scrambled eggs



time it takes you now. It will be easier for your kids to get to school, for your wife to shop.

How quickly you can expect your particular suburb to lose its individuality depends on where you live. It will happen a lot faster in the 14 present Interurbias—but they are little more than seeds of the future.

Best yardstick to judge your own situation is to see how closely it fits the experts' definition: An Interurbia must contain two or more adjacent metropolitan areas with either: (1) two cities of 100,000 or more each; or (2) one city of 100,000 and three of 25,000 or more. In both cases, it must have adjacent counties with less than 25 percent farm population and more than 100 people per square mile.

Your Interurbia will grow fastest if you live either in the Northeast or in California. The 600-mile eastern super-city now growing along the Atlantic and creeping up the Hudson may sprout a westward leg, linking up with Cleveland, Chicago and Detroit to make a city strip 1,200 miles long.

California suburbanites can look for the same sort of thing—and soon: An urban strip stretching from San Diego north to connect in the Sacramento Valley with a southward movement from San Francisco. Other Interurbias in 1975 may not be as big. But they will be just as effective, undoubtedly, in changing your way of life.

That effectiveness may well include changes in basic economies. The one-industry city may vanish (as it has in Los Angeles), extending the "scrambled-egg" quality to employment as well as social structures. Thus while your neighbor may be in a job similar to yours now, in the future he may be at a totally different post. In fact, machinists, professors, and dog-catchers may all live in far more similar fashion

Interurbia in 1975: about 60 percent of the U. S. population (estimated at 207 to 228 million) will live on four to five percent of the total land area



Because business and industry are already leapfrogging the suburbs—with modern offices and plants going up near residential areas—you may get to work in a quarter of the time it takes you now

—cars, houses, furnishings, appliances—than they do now.

However, as an Interurbian, the experts say, you will have a growing desire to be socially different from your neighbors—the uniformity of present-day mass housing is already bringing this out. As the Interurbian male, you will have a normal desire for achievement—you'll look for both prestige and acclaim. You will want to be a leader, to influence others. You and your wife will both feel a need for being sometimes the center of attention.

Your community will have a growing sophistication—because the spreading city will bring sophisticated urban ideas and sophisticated people into Interurbia. You will like variety and novelty, will be ready to try things new and different.

And you and your neighbors will demand high quality in goods you buy; together, you will make up the group that determines when a luxury becomes a necessity. You can look for some suburbs' prim, small-town qualities to disappear: Interurbians have a freer attitude toward sex—for example—and both men and women will be more willing to talk about it where you live than people do who live elsewhere.

Also: your Interurbia will have more women in proportion to men than other parts of the country. One estimate for the New York region in 1975: 87.6 men for every 100 women as against a national probability of about 92 men for every 100 women.

But what will all this mean to you if you live in a town of, say, 50,000 or less, with no big city nearby? Then you can look for changes similar to those of Interurbia, but on a smaller scale. There will be the same mushroom growth, a similar "scrambled-egg" quality of social and economic structure. Note that such relatively small communities already support as many as half a dozen shopping centers, for example, within a few miles of each other.

If you live on farms well away from Interurbia, you won't see much change at all. Interurbia won't need the space; it will grow mostly internally, using land still undeveloped within its orbit. (Only about half our land is used for crops and pasture and there's plenty of room to expand it for growing population needs.)

The same is true of parks and recreational areas—except right within the super-city, these areas won't be overrun.

Velocity will magnify old problems tremendously—for example, your community will be needing more and more schools. (Los Angeles right now needs a 32-room schoolhouse every week for the next 15 years.)

And your transit problems will be tougher for a while—until superhighways get built. That, in turn, may force you to move somewhere else in town: Present highway programs alone call for the destruction of 90,000 houses a year.

But on the whole, once the growing pains begin to ease, the men who foresee it say your new way of life will probably be a *better* way of life than you have ever known. **END**



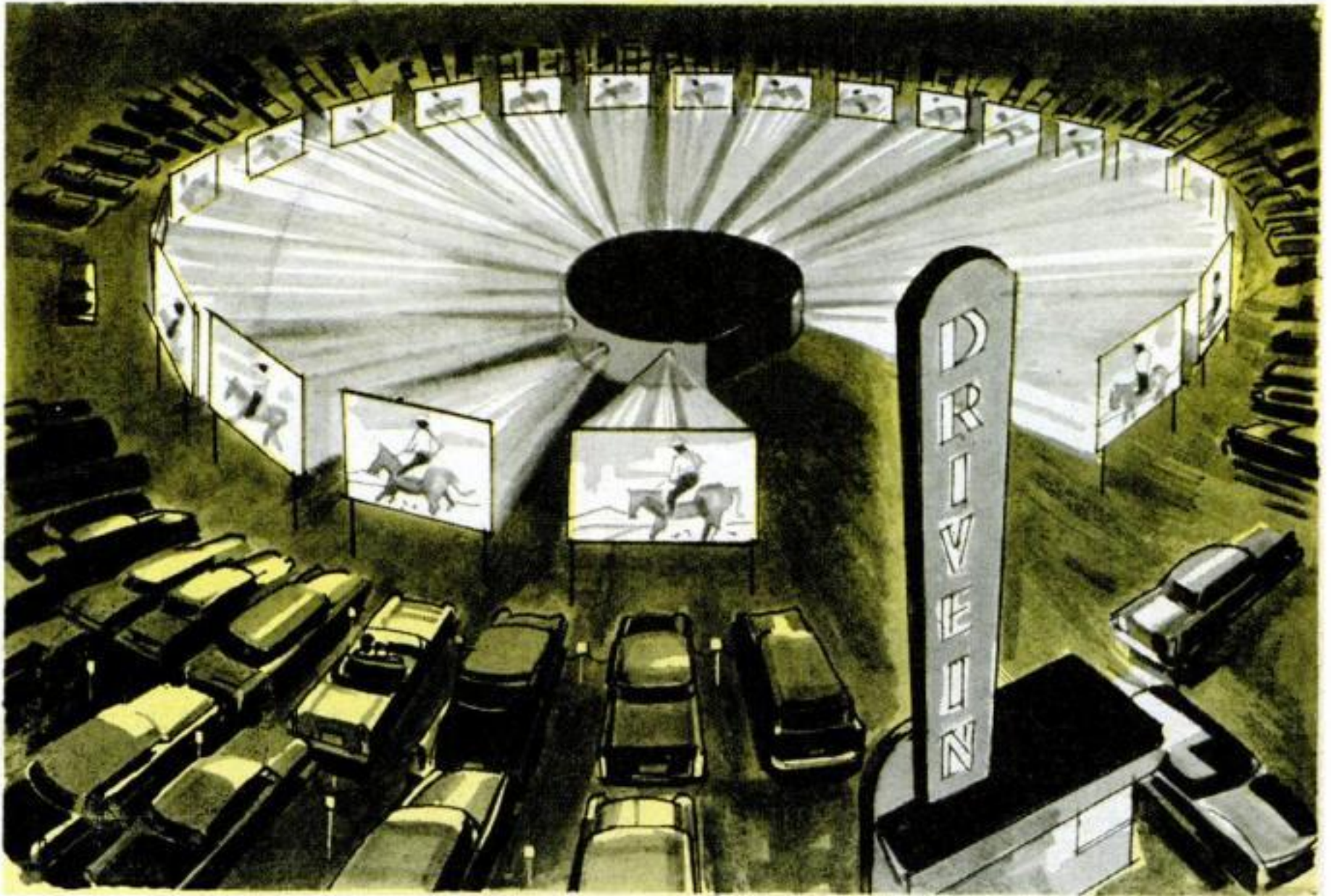
You and your neighbors will demand high quality in the goods you buy; together you will make up the group that determines when a luxury becomes a necessity



Commuting problems will be tougher for a while—until superhighways, planned to run through the heart of Interurbia, finally get built and operating

New Ideas from the Inventors

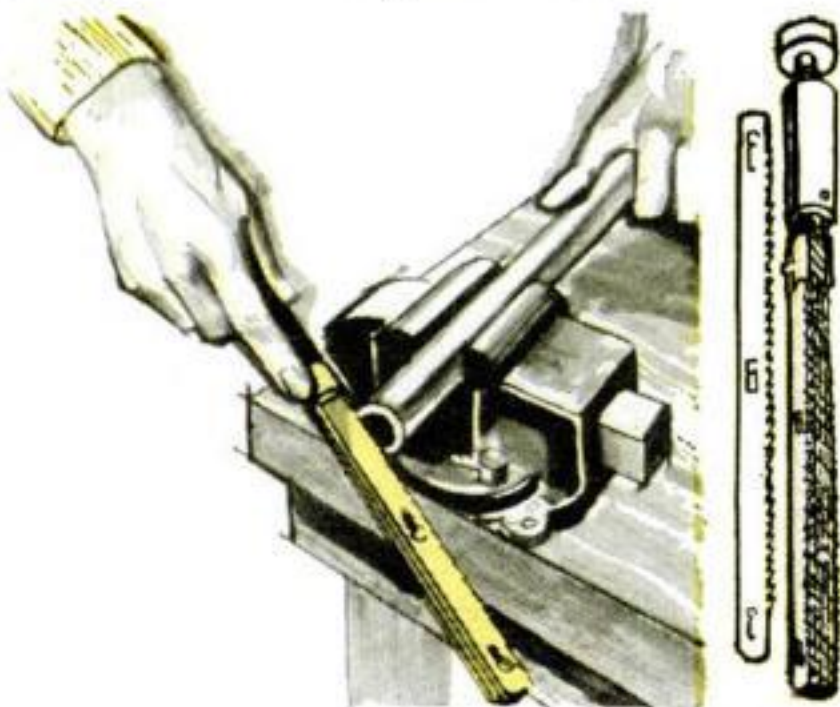
.....



1 Screens Circle Drive-in. No matter where they parked, moviegoers would see pictures of equal size and brightness. With this recently patented arrangement

of lenses and mirrors, a central projector could flash the same picture onto a number of individual screens. Each would serve a small group of cars.

2 Blade File Varies Cut. Made up of clamped-together hacksaw blades, this tool could be quickly changed from a fine-toothed file to a coarse, quick-cutting rasp. A screw (that would adjust the angle of a pin running through the slotted blade ends) would change the bite.



3 Harness Quiets Barking Dog. With a throat microphone acting as a switch for a built-in electric circuit, this outfit would give a dog a light shock every time he yelped. The inventor says the "mildly disagreeable sensation" would train a dog that barks or whines too much.



Please turn the page for more new ideas

APRIL 1958 147

More Inventors' Ideas



4 Backlight Cuts Rearview Glare. Most methods of eliminating mirror glare also dull normal visibility. But, says this inventor, good mirror reflections without glare can be obtained by backlighting a glass that is treated to be partly reflective and partly transparent.



5 Goggles Unlock Machine. You couldn't mislay your eye protectors or forget to wear them before starting up a grinder that had a switch like this. A clip for the goggles would form part of the switch, so you'd have to remove them to start the motor, return them to stop it.

6 Refrigerator Serves Up Music. A radio built into the door of a refrigerator (and connected across the motor or light circuit) might conserve worktable

space and help minimize kitchen clutter. Mounted at a convenient height in an insulated door recess, the receiver would be vented through its own front panel.





7 Power Lines Relay Warning. Connected to an AC outlet, this plug-in alarm would sound off when normal line frequency was changed at the power station. At other times it would remain silent and draw no current. The system would spread air-raid or other alarms instantly.

8 Rain Sock Protects Cuff. You wouldn't have to have your pants pressed after being caught in the rain if you carried a pair of these plastic socks. Worn inside your shoes, the "oversocks" would keep your feet dry while the leg covers protected the cuffs. A clamp designed to hold a trouser crease would support the upper part of each sock.



9 Armrest Guards Rider. Extended as shown, this pivoted armrest would keep an auto passenger from being thrown forward by sudden stops or being bounced upward if the car hit a bump. The protective arm, which would fold back against the car side, could be size-adjusted to suit children or grown-up riders.

The following patents have been issued on these inventions: 1. Patent No. 2,734,420 to Tom F. Smith, Urbana, Mo.; 2. No. 2,738,568 to Gennaro Civitelli, Hamden, Conn.; 3. No. 2,741,224 to Tracy J. Putnam, Beverly Hills, Calif.; 4. No. 2,790,350 to Peter C. Cameron, Bethesda, Md.; 5. No. 2,800,543 to Michael D. Herzog, Brooklyn; 6. No. 2,795,639 to Alexander Rawson, Brooklyn; 7. No. 2,709,801 to William S. Sprague, Hollydale, Calif.; 8. No. 2,741,770 to Max Tannen, Brooklyn; 9. No. 2,905,081 to Maurice Frimet, Staten Island, N.Y.

Copies of patents may be ordered, by number, from the Commissioner of Patents, Washington 25, D.C., at 25 cents each. To write to an inventor, if the address given above is insufficient, you may address him (by name and patent number) in care of the Commissioner of Patents.

Planning to buy a boat? Then hear this—

Bargain Boats Come in Kits

By George Daniels

HARBOR masters in some of the nation's leading ports report a startling new fact: As many as half of all small, private boats afloat never saw the inside of a factory or showroom. Some were homemade from scratch; many thousands more got their start as kits, either partly or wholly assembled by their owners.

That kit boats are popular is attested to by booming sales. One maker has already sold 50,000 of one model alone, another maker 40,000 of another model. And this is a small fraction of total sales since kit boats come in a staggering array of

just about any type you can name, from prams, skiffs and runabouts to giant cruisers and even schooners.

What do you gain? You can buy kits in any of several different stages of construction. If you start with a complete kit of parts and do the entire assembly job, you can have your boat for half the price of the same model factory-built. Order the same kit fully assembled but unpainted and you can still save about 15 percent by doing the finishing yourself.

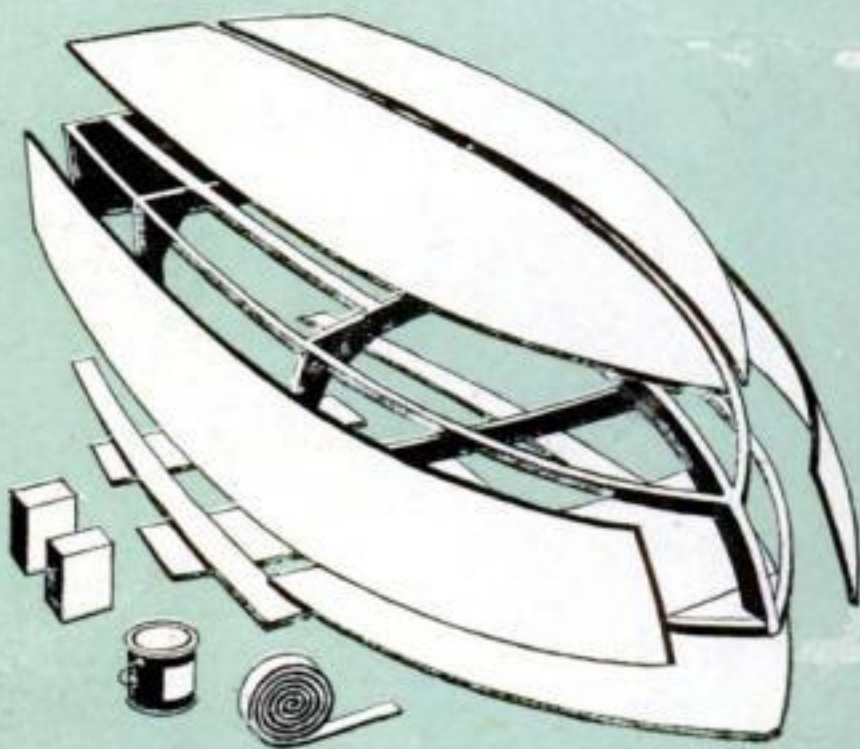
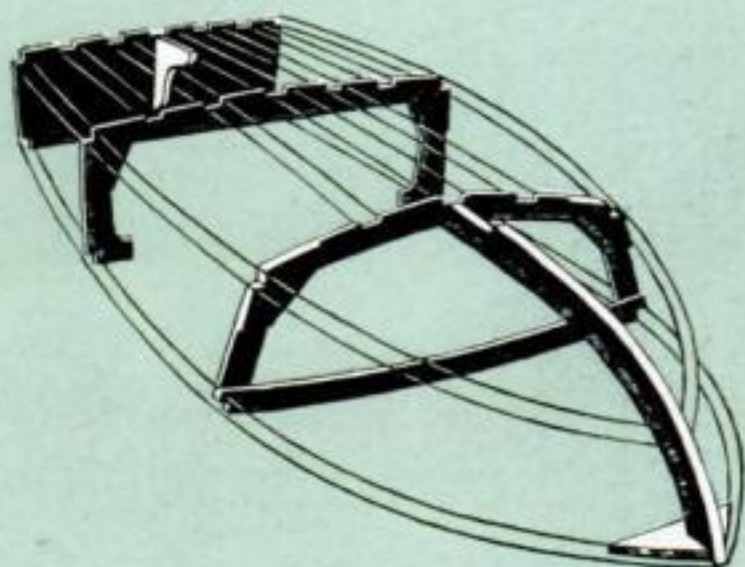
You don't even have to buy a complete kit outright. Some makers offer a "pay as you build" plan, enabling you to buy your kit in several stages with parts pack-

Consumer News

You can buy kit boats in four different ways

FRAME KITS contain hard-to-make parts shown in black, offer biggest savings because you buy rest of lumber locally. A few kits also include longitudinal strips shown in outline. All kits give full plans for completing boat.

PRECUT KITS supply everything you need for complete boat, even screws and glue, but parts are rough-cut and require shaping and finishing. Preformed kits are similar, but have more work done for you, as shown at right.





Big sellers show the booming popularity of kits

MORE THAN 50,000 KITS have already been sold for Taft Marine's 12' utility-runabout above. Complete pre-cut kit costs only \$95, frame kit \$59. Estimated assembly time: 30 hours.

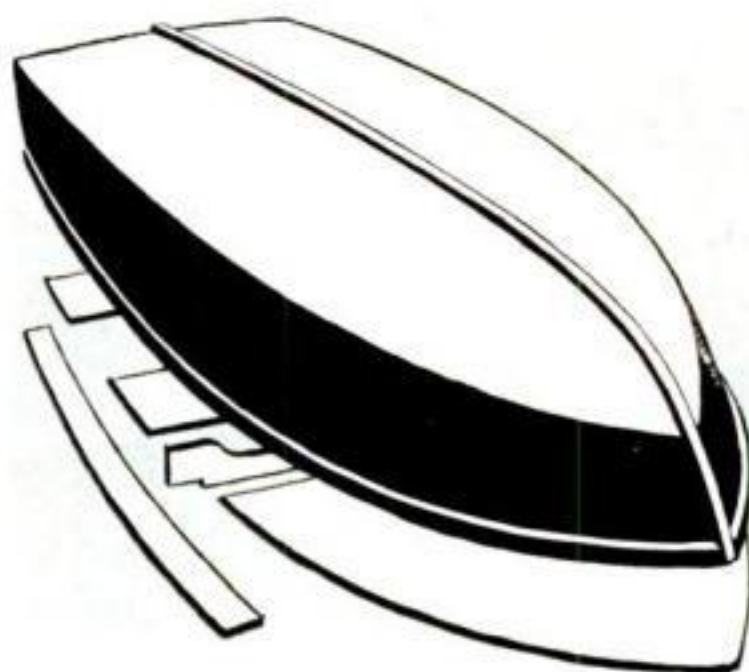
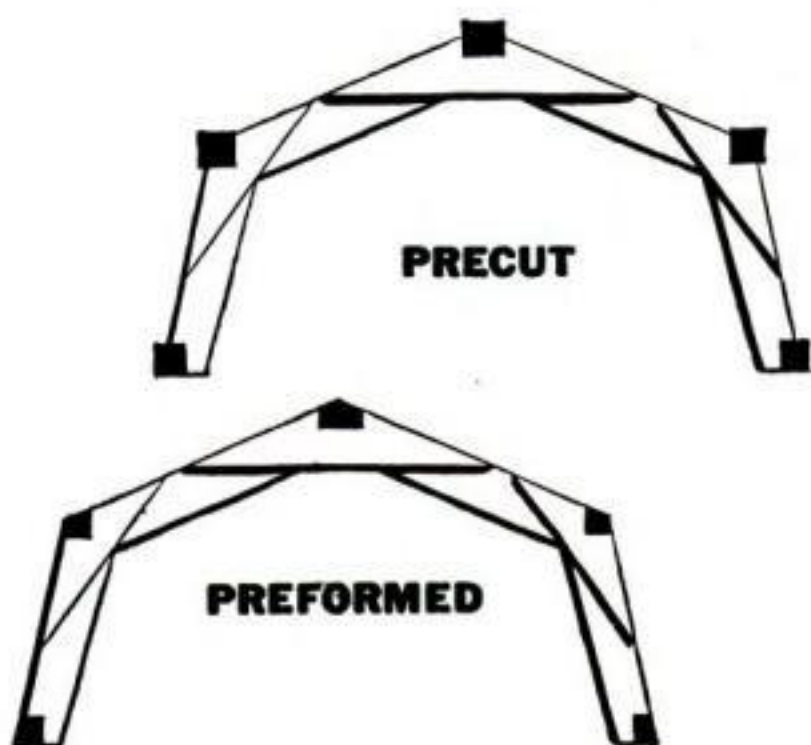
CHALK UP 40,000 MORE for this 8' Roberts pram. It sells for \$58 as kit, \$110 assembled and \$150 fully finished—so you can see what you save. Accessory sail kit also comes for \$65.

aged according to the order in which they will be assembled. You pay for the parts you receive, assemble them, then buy the next batch when your budget permits. Other makers let you make a down payment, then spread the rest of the boat's cost over 12, 24 or as many as 30 monthly payments.

Kits also permit custom tailoring not possible with ready-made models. Some builders like to start with a basic hull frame, then add their own styling touches in decking and interior design. Since most kits don't include hardware, you have the opportunity of choosing just what you want in deck fittings, steering wheels,

DIFFERENCE IN WORK YOU DO can be considerable, as shown below. In pre-cut kits, longitudinals and other parts must be planed to match frame angles. Preformed kits come shaped to fit, may also be pre-drilled for screws and bolts.

PRE-ASSEMBLED KITS require least work, cost more, but come with a ready-built wood hull or molded glass-fiber hull. All you add are decking and interior details. This way, you're sure of a watertight job where it counts the most.



windshields, remote controls and other accessories.

Are they hard to build? Anybody who can do a household fix-it job can put a kit boat together. You use the same methods and the same tools. The tricky hard-to-make parts are already completed for you. There's no steam bending to do. Every part that has to take a curve has its shape when you get it or can be bent easily into position, either dry or after a brief water soaking.

What are your chances of finishing the job? The odds are excellent. One manufacturer who has been turning out kit boats for half a century claims that every kit his company ever sold has been successfully completed.

How long does it take? To build a typical 16', 40-m.p.h. runabout, you put together as few as 11 parts to complete the hull, a total of 32 for the whole finished boat. Actual cases show that the average person can do the job in about 70 working hours, an experienced craftsman in less. Prams and small skiffs go together in around eight to 14 hours.

Some kits come with a one-piece molded glass-fiber hull that's ready to float when you get it and requires only seats and deck for completion. These cost more (\$345 vs. \$269 for a wood hull, for example), but if you're short on spare time and long on spare cash you can have your boat ready to launch in as little as 10 hours and still enjoy a sizable saving. An added advantage of molded hulls: The color you specify is "built in" and never needs repainting.

In another type of glass-fiber kit you home-mold your own hull in a mold lent

to you by the manufacturer. A 16-footer takes about 50 hours to complete by this method and costs a little under \$400.

If you like the advantages of tough, maintenance-free glass-fiber but prefer building with plywood, you can add a glass-fiber cover over the wood hull. Many kit manufacturers furnish all necessary materials in a supplementary kit to match your boat. You can cover a typical 18' hull for about \$70, eliminating permanently the need for painting anything but deck or cabin. If you use paint instead, the kit for hull, deck and cabin costs about \$45.

What you get and don't get. Kits are classed in four general types according to the parts they contain and the amount of work already done for you. The extras included vary with each manufacturer and most catalogues list them in detail. Some even list the items specifically not included.

Frame kits are the lowest in price and include only the framework parts—usually the stem, transom, frames, and small items like breasthook and transom knee. To reduce shipping costs, most frame kits don't include longitudinal members like keel, chines, and sheer clamps. You buy lumber locally for these as well as for planking, decking, and the rest of the boat. Your frame kit contains complete plans and instructions for building the boat, and in some instances full-sized patterns for the parts you have to make yourself.

Precut kits contain all the frame parts, including longitudinal members, plus cut-to-shape planking, decking and all other wood parts. You also get the necessary

Who makes them

Aeme Boat Co., Miamisburg, Ohio (Runabouts and outboard racers)

Alcort, Inc., P.O. Box 1345, Waterbury, Conn. (Sailing surfboard kits)

Bay City Boat Co., 304 State St., Bay City, Mich. (Inboard utilities, runabouts, cruisers)

Boat Kits, Inc., 1415 W. 92nd St., Bloomington, Minn. (Runabouts and cruisers)

Champion Boats, 1524 W. 15 St., Long Beach, Cal. (Outboard runabouts, inboard and outboard racing boats)

Chris-Craft Corp., Box 2002, Pompano Beach,

Fla. (Prams, utilities, runabouts, inboard and outboard cruisers)

Craig Craft, Tonawanda, N.Y. (Prams, skiffs, utilities, runabouts, cruisers)

Culver Craft, Box 381, Downey, Cal. (Utilities, runabouts, cruisers)

Custom Craft, Inc., 1700 Niagara St., Buffalo 7, N.Y. (Prams, runabouts, inboard and outboard cruisers)

Dillabaugh Co., 220 N. E. Columbian Blvd., Portland 11, Ore. (Runabouts, cruisers)

Doane Marine Works, Stamford, Conn. (Precut fishing dory kits)

Douglass & McLeod, Box 311, Painesville, Ohio (Ready-built sailboat hulls)

Which type boat is best for you?



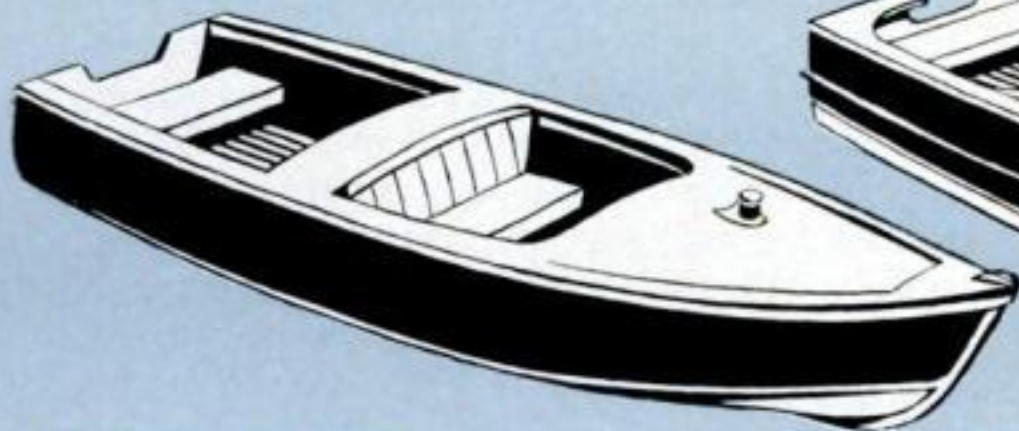
PRAM is squared off at both ends, eliminating tricky fitting at bow. Bottom can be flat (easiest to assemble) or slightly V shaped. Most common length is 8'. Prices range from \$50 to about \$70 for complete kit, are as little as \$30 for frame only.



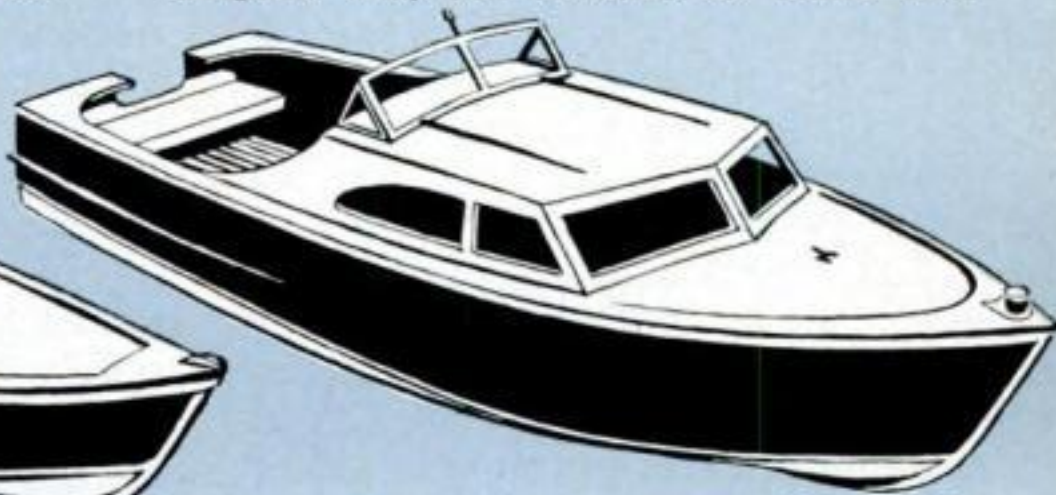
SKIFF has pointed bow but flat bottom, making it almost as easy to assemble as a pram. It's good for slow, stable rowing or outboarding, but is not built for speed. Lengths are usually 10' or 12'. Complete kits sell for \$70 to \$80, frame kits about \$35.



UTILITY has V bottom, may be open or have short foredeck. Most hulls are "planing" type, similar to runabout, but a few are slower "displacement" type. Lengths run 12' to 16', prices from \$120 to \$290 for complete kits, \$55 to \$120 for frame kits.



RUNABOUT has fast "planing" hull, is fancy version of utility. It usually has longer foredeck, dividing center deck and often a stern deck. Lengths go up to 18', speeds up to 40 m.p.h., prices from \$170 to \$580 for full kits, \$60 to \$170 for frame kits.



CRUISER is biggest assembly job, but affords biggest savings. Sizes run from small 16-footers that sleep two (\$350, complete kit), to big 23-footers that sleep three (\$1,100). But—watch—frame-kit prices for same sizes are only \$110 to about \$200.

Fiberlay, Inc., 1158 Fairview N., Seattle 9 (Molded glass-fiber hulls and hull kits)

General Marine Co., 6th & Oad, St. Joseph, Mo. (Skiffs, utilities, runabouts, inboard and outboard cruisers, racing boats)

Glen L. Marine, P.O. Box 568, Compton, Cal. (Utilities, runabouts, racers, cruisers)

Ladd Built Boats, 1514 E. Scotts Ave., Stockton 5, Cal. (Assorted types of kits and pre-assembled hulls)

Luger Industries, 3404 Lyndale Ave., S., Minneapolis (Prams, runabouts, cruisers)

Milo Craft Boat Mfg., 7737 S. Western Ave., Chicago, Ill. (Assorted types of kits and premolded hulls)

Montgomery Ward, 619 W. Chicago Ave., Chicago, Ill. (Utilities and runabouts)

Robert B. McKean, 180 Prospect Ave. E., Mamaroneck, N.Y. (Racing sailboat kits)

Roberts Kit Craft, 12 Post Rd., Branford, Conn. (Prams, skiffs, racing sailboats)

St. Cloud Marine Mfg. Co., P.O. Box 695, St. Cloud, Fla. (Pre-assembled cruisers)

Sears Roebuck & Co., 925 S. Homan Ave., Chicago (Prams, runabouts, cruisers)

Taft Marine Woodcraft, 636 39th Ave. N. E., Minneapolis (Prams, skiffs, utilities, inboard and outboard runabouts, cruisers)

U-Mak-It Products, 569 U. S. Hwy. 92, DeLand, Fla. (Prams, skiffs, runabouts, cruisers)

bolts, screws, nails, and other fasteners, but not hardware or paint. Some manufacturers package hardware items in groups to match your boat kit; others sell them individually and let you pick the style and price you want. For a typical 16' runabout kit, the basic hardware group costs \$12.15, a remote steering setup (wheel unit, pulleys, cables, etc.) \$33.40, and a plastic wraparound windshield, complete with brackets, \$26.25.

In assembling a precut kit you usually have to do most of the beveling and "fairing in" of the framework to assure a good fit with the planking. This is chiefly a planing job, though a rasp is handy for some areas. The cut-to-shape planking sections will need some trimming, too, as they're slightly oversize to allow for snug fitting. Seats, flooring and cabin parts are also cut to shape, but may require similar fitting.

Preformed kits contain all the parts of the precut kit, but have more work already done when you get them. Most of the bevels have been machined on the framework so the most you'll need to add is a slight dressing down here and there.

Since hand shaping is a big part of the job, a preformed kit can be a substantial time- and work-saver. It's important, however, to know exactly what you're getting. In some preformed kits, only some of the parts are actually preshaped. On the other hand, some precut kits include a considerable amount of preshaping. Often the difference between the two types is very slight. A few kits, classed as "ready cut," are not only preformed but are fully assembled at the factory, then taken apart for shipping.

Most preformed kits naturally cost more than the precut type, but on small boats the difference can be as little as \$10. On larger boats, such as a typical 18' cabin cruiser, the difference can be big: \$200. If you can't examine a kit before you buy, study the catalogue description carefully to be sure just how much work has been done and how much you will have to do yourself.

Pre-assembled and molded kits. In this group you'll find one-piece molded hulls, molded half-hulls that require only joining, preplanked hulls, and, in larger boats, completely assembled hull frames. The type of work remaining to be done differs with the manufacturer. Some

molded hulls are complete with transom; some simply include a transom as part of the kit assembly job.

A pre-assembled hull assures you of a good tight job below the waterline, and still affords you a sizable saving through a home-assembled deck, cabin, and interior. Many kit manufacturers also sell fully assembled but unfinished boats. You do the painting and add the hardware, and you'll still save 10 to 15 percent.

What are the pitfalls? Experience shows that kit buyers who follow the instructions carefully have almost no trouble. The major cause of headaches is failure to read or follow the instructions and, sometimes, the use of "short cuts." Fortunately, a single mistake won't make your kit a total loss. If you spoil a part, you can get a replacement from the manufacturer or make a new one yourself, using the damaged one as a pattern.

If you want to start off easy, flat-bottom boats, such as skiffs and prams, are a good bet. The bottom joins the sides in a simple lap joint and goes together almost as easily as a box.

Boats with V bottoms are a little trickier to assemble, particularly if you choose a lapstrake design that requires the fitting of many individual planks. In general, plywood-covered hulls go together fastest because you work with big sheets, although some twisting of the plywood is required where it curves up at the bow.

If you like a particular boat but aren't sure you'd be able to assemble it, ask the manufacturer if assembly instructions are available separately. Many kit makers sell instructions in advance for a small charge, in some cases refunding the price when you buy your kit. This way, you can see the kind of work you'll be doing and decide whether you want to undertake the job.

The right tools save time. A spiral ratchet screwdriver, or a screwdriver attachment for an electric drill, is handy when you have to drive more than 1,000 screws in a hull—not unusual in an 18-footer.

Combination bits for electric drills will bore screw holes for the thread, shank and countersunk head in a single operation. Later, you can also use sanding disks in the drill to speed finishing. An-

[Continued on page 240]

Your Guide to the '58 Power Mowers

The pitch this year is convenience. And the improvements that make new machines easier to use hint of still more to come

By Martin Mann

YOU can spot the trend in this spring's crop of power mowers. It's convenience—easy starting, wide-cutting swaths (for a faster job), safety, smart appearance. The talk in the trade is that this is only the beginning.

Many '58 models are restyled versions of the '57s. But the changes that did show up are significant, hinting at more

general and more radical improvements to come.

The chart on pp. 156-7 details specs for 46 models of 18 makes. All are hand-pushed rotaries of the popular 18- to 22-inch size. (Rotary machines are definitely the preference of the average home owner. They will account for 90 percent of all mowers sold.)

New for '58. One important development is price: Some makes are cheaper



FUEL-TANK HANDLE—no stoop, no hazard from gas spilled on hot engine—marks new Reo.

Height-adjuster knobs at wheels, engine controls at handle are conveniences on many '58 mowers.

Facts and Figures on

ENGINE

MAKE AND MODEL		PRICE	CUTTING WIDTH	WEIGHT (lb.)	MAKE AND MODEL	CYCLES	HORSEPOWER AT WHAT R.P.M.	TORQUE (lb.-ft.) AT WHAT R.P.M.	AREA OF MAINSHAFT BEARING (sq. in.)	AIR CLEANER
BOLENS	6118	\$ 58	18"	50	Power Products AV47	2	2.0 @ 3,400	3.2 @ 3,000	a	dry
	6218	\$ 80	18"	55	Briggs and Stratton 6B-HS	4	1.75 @ 3,200	3.0 @ 2,900	1.78	oil
	6219	\$ 95	19"	60	Briggs and Stratton 6B-H	4	2.25 @ 3,600	3.4 @ 3,200	1.78	oil
CASEY MOW	19SE2R	\$ 59	19"	46	Power Products V-47-618	2	2.0 @ 3,400	3.2 @ 3,000	a	dry
	19SE4R	\$ 70	19"	50	Clinton VS 2100	4	2.0 @ 3,600	3.2 @ 3,000	1.70	dry
CHOREMASTER	18EC-3	\$ 65	18"	60	Power Products V-47	2	2.0 @ 3,400	3.2 @ 3,000	a	dry
	18EC-2	\$ 80	18"	60	Clinton VS 2100	4	2.0 @ 3,600	3.2 @ 3,000	1.70	dry
	18FW-1	\$ 95	18"	65	Briggs and Stratton 6B-H	4	2.25 @ 3,600	3.4 @ 3,200	1.78	dry
DILLE & McGUIRE Turfmaster	Aero L18	\$ 55	18"	38	Power Products V-47	2	2.0 @ 3,400	3.2 @ 3,000	a	dry
	Aerolite A18R	\$ 80	18"	43	Briggs and Stratton 6B-HS	4	1.75 @ 3,200	3.0 @ 2,900	1.78	oil
	King RA18R	\$100	18"	58	Briggs and Stratton 6B-H	4	2.25 @ 3,600	3.4 @ 3,200	1.78	oil
ECLIPSE	Pal	\$ 50	17"	39	Power Products V-47-60517	2	2.0 @ 3,400	3.2 @ 3,000	a	dry
	Duo-Master	\$105	19"	53	Briggs and Stratton 6B-H	4	2.25 @ 3,600	3.4 @ 3,200	1.78	oil
	Duo-Master F-19	\$110	19"	50	Briggs and Stratton 6B-H	4	2.25 @ 3,600	3.4 @ 3,200	1.78	oil
HOMKO	AP 819	\$ 60	19"	n.s.	Briggs and Stratton 6B-HS	4	1.75 @ 3,200	3.0 @ 2,900	1.78	oil
	JK50	\$ 90	18"	56	Briggs and Stratton 6B-HS	4	1.75 @ 3,200	3.0 @ 2,900	1.78	oil
JACOBSEN	63	\$ 80	18"	56	Jacobsen J-100VESJ	2	1.8 @ 4,000	2.4 @ 4,000	b	dry
	77	\$ 93	18"	57	Jacobsen J-100VES	2	1.8 @ 4,000	2.4 @ 4,000	b	dry
	75	\$140	18"	79	Jacobsen J-125VS	2	2.25 @ 4,000	3.1 @ 4,000	b	dry
LAWN-BOY	3200	\$ 70	18"	38	Lawn-Boy C-21	2	1.85 @ 4,000	3.0 @ 2,800	2.63	dry
	5200	\$ 90	18"	44	Lawn-Boy C-13	2	2.5 @ 4,000	3.5 @ 3,000	2.63	dry
MONTGOMERY WARD	HM-125A	\$ 60	18"	50	Power Products V-47-615	2	2.0 @ 3,400	3.2 @ 3,000	a	dry
	HM-1A	\$ 90	19"	63	Briggs and Stratton 6B-H	4	2.25 @ 3,600	3.4 @ 3,200	1.78	oil
MOTO-MOWER	Catalina	\$ 90	18"	50	Briggs and Stratton 6B-HS	4	1.75 @ 3,200	3.0 @ 2,900	1.78	oil
	Standard Catalina DeLuxe	\$100	18"	48	Briggs and Stratton 6B-H	4	2.25 @ 3,600	3.4 @ 3,200	1.78	oil
PENNSYLVANIA	66218B	\$100	18"	55	Briggs and Stratton 6B-HS-XM	4	1.75 @ 3,200	3.0 @ 2,600	1.78	oil
	67221	\$110	21"	65	Briggs and Stratton 6B-H-XM	4	2.25 @ 3,600	3.4 @ 3,200	1.78	oil
REO	TLR-218	\$ 70	18"	49	Motor Wheel Corp.	2	2.1 @ 3,400	3.0 @ 3,400	6.48	dry
	TLR-221	\$ 80	21"	54	Motor Wheel Corp.	2	2.1 @ 3,400	3.0 @ 3,400	6.48	dry
	TLR-421	\$100	21"	59	Motor Wheel Corp.	4	2.5 @ 3,400	3.9 @ 3,400	6.36	dry
SAVAGE	Olympic 48	\$ 68	18"	50	Briggs and Stratton 6B-HS	4	1.75 @ 3,200	3.0 @ 2,900	1.78	oil
	Olympic 49R	\$ 83	20"	57	Briggs and Stratton 6B-H	4	2.25 @ 3,600	3.4 @ 3,200	1.78	oil
	Savage 30T	\$100	18"	53	Briggs and Stratton 6B-HS	4	1.75 @ 3,200	3.0 @ 2,900	1.78	oil
SEARS, ROEBUCK	Dunlap 8143	\$ 40	18"	43	Power Products V-47-601	2	2.0 @ 3,400	3.2 @ 3,000	a	dry
	Craftsman 8811	\$ 70	18"	62	Craftsman 143.60020	4	2.0 @ 3,600	3.1 @ 3,200	1.98	dry
	Craftsman 8817	\$ 80	18"	58	Craftsman 143.50020	4	2.0 @ 3,600	3.1 @ 3,200	1.98	dry
SPIEGEL	8211	\$ 47 ^c	19"	45	Power Products V-47	2	2.0 @ 3,400	3.2 @ 3,000	a	dry
	8120	\$ 59 ^c	21"	65	Clinton VS 100	4	2.5 @ 3,600	3.8 @ 3,000	1.70	dry
	8210	\$ 70 ^c	22"	66	Briggs and Stratton 8B-H	4	2.75 @ 3,600	4.3 @ 3,000	1.78	oil
SPRINGFIELD	Special	\$ 60	19"	49	Power Products V47-618	2	2.0 @ 3,400	3.2 @ 3,000	a	dry
	5819-2C									
	Super	\$ 75	19"	53	Clinton VS 2100	4	2.0 @ 3,600	3.2 @ 3,000	1.70	dry
	5819-CL Sovereign	\$ 85	22"	56	Briggs and Stratton 8B-H	4	2.75 @ 3,600	4.3 @ 3,000	1.78	oil
TORO	Standard	\$ 90	18"	46	Briggs and Stratton 6B-HS	4	1.75 @ 3,200	3.0 @ 2,900	1.78	oil
	Whirlwind 21017									
WESTERN AUTO	Wizard	\$ 48	18"	32	Clinton V 5200	2	2.0 @ 3,800	2.75 @ 3,800	1.94	dry
	2X2708									
	Wizard	\$ 63	18"	40	Clinton V 32100	4	2.0 @ 3,600	2.9 @ 3,600	1.70	dry
	2X2809									
	Wizard	\$ 80	19"	49	Briggs and Stratton 6B-S	4	2.25 @ 3,600	3.3 @ 3,600	1.78	oil
	2X2817 Custom									

NOTE: n.s. This information not specified by manufacturer
 * one needle bearing, one powdered-metal bearing

^b two ball bearings, one needle bearing
^c average thickness

1958 Rotary Mowers

CUTTER

BODY

MUFFLER SIZE (cu. in.)	STARTER	HOW CLOSE TO WALL CAN MOWER TRIM? HEIGHT OF CUT				LEAF MULCHER	HOUSING MATERIAL	WHEEL DIAMETER		WHEEL MATERIAL	WHEEL ARRANGEMENT	WHEEL BEARING
		Front	Side	Lowest	Highest			Front	Rear			
4.0	rope	1/2"	3/8"	1"	2"	included	14 ga. steel	6"	6"	plastic	in-line	nylon
16.5	recoil	1/2"	3/8"	1"	2-1/2"	included	14 ga. steel	6"	6"	plastic	in-line	nylon
16.5	foot	1/2"	3/8"	1"	2-1/2"	included	14 ga. steel	7"	7"	plastic	staggered	nylon
4.0	recoil	n.s.	1"	1"	3"	included	1/4" aluminum ^c	6"	6"	metal	in-line	nylon
6.6	recoil	n.s.	1"	1"	3"	included	1/4" aluminum ^c	6"	6"	metal	in-line	nylon
4.0	rope	5"	1/2"	1"	3"	extra	14 ga. steel	7"	7"	steel	in-line	powdered metal
6.6	recoil	5"	1/2"	1"	3"	extra	14 ga. steel	7"	7"	steel	in-line	
6.4	recoil	5"	1/2"	1"	3"	included	14 ga. steel	7-1/2"	7-1/2"	steel	in-line	
4.0	rope	n.s.	1/2"	1"	3"	extra	5/32" aluminum	7"	7"	steel	in-line	nylon
6.4	recoil	1/2"	1/2"	1"	3"	extra	5/32" aluminum	7"	7"	steel	staggered	nylon
6.4	recoil	n.s.	1/2"	1"	3"	included	3/16" aluminum	8"	8"	steel	in-line	nylon
4.0	rope	1/2"	1/2"	1"	3"	included	14 ga. steel	6"	6"	plastic	in-line	nylon
6.4	recoil	1/2"	1/2"	1"	3"	extra	14 ga. steel	6"	8"	steel	staggered	ball
6.4	recoil	1/2"	1/2"	1"	3"	extra	1/4" aluminum	6"	8"	aluminum	staggered	ball
6.4	recoil	3/8"	3/8"	1/2"	2-1/4"	extra	16 ga. steel	6"	6"	steel	in-line	powdered metal
6.4	recoil	3-1/2"	3/8"	1-1/2"	3"	extra	16 ga. steel	6-1/2"	6-1/2"	steel	in-line	
12.5	recoil	2"	3/8"	1"	3"	none	14 ga. steel	6"	6"	steel	staggered	sleeve
55	recoil	1-1/2"	3/8"	3/4"	2-3/4"	included	1/10" aluminum ^d	6"	6"	steel	staggered	sleeve
55	recoil	1-3/4"	3/8"	3/4"	2-3/4"	included	5/32" aluminum	6"	8"	steel	staggered	sleeve
57	rope	3/8"	3/8"	5/8"	2-5/8"	extra	1/8" aluminum	6"	8"	plastic	staggered	nylon
75	recoil	3/8"	3/8"	1"	3"	extra	1/8" aluminum	6"	8"	plastic	staggered	nylon
4.0	rope	1-7/8"	1/2"	1-1/4"	3"	extra	14 ga. steel	5"	7"	steel	staggered	powdered metal
16.5	recoil	1-7/8"	1/2"	7/8"	2-3/4"	included	3/32" aluminum ^d	6"	9"	aluminum	staggered	
6.4	recoil	1/2"	3/8"	1"	3"	extra	1/8" aluminum	6"	8"	steel	staggered	powdered metal
6.4	recoil	1/2"	3/8"	1"	2-1/2"	extra	1/8" aluminum	6"	8"	steel	staggered	powdered metal
16.5	recoil	1-1/8"	1/2"	1"	3"	included	3/16" aluminum	7"	7"	steel	staggered	sleeve
16.5	recoil	1-1/8"	1/2"	1"	3"	included	3/16" aluminum	7"	8"	steel	staggered	sleeve
2.5	recoil	3/8"	3/8"	1"	3"	none	14 ga. steel	6"	6"	steel	in-line	powdered metal
2.5	recoil	3/8"	3/8"	1"	3"	included	14 ga. steel	7"	7"	steel	in-line	
8.0	recoil	3/8"	3/8"	1"	3"	included	14 ga. steel	7"	7"	steel	in-line	
6.4	rope	1/2"	1/2"	1"	2-3/4"	extra	14 ga. steel	6"	6"	steel	staggered	powdered metal
6.4	recoil	1/2"	1/2"	1"	2-3/4"	extra	14 ga. steel	6"	8"	steel	staggered	
6.4	recoil	1/2"	1/2"	1"	2-3/4"	included	14 ga. steel	6"	8"	steel	staggered	
4.0	rope	3/8"	3/8"	1"	2-7/8"	extra	16 ga. steel	6"	6"	steel	in-line	powdered metal
9.0	recoil	3/8"	3/8"	1/2"	3"	included	16 ga. steel	7"	7"	steel	in-line	
15.8	recoil	3/8"	3/8"	1/2"	3-1/2"	included	1/4" aluminum	7-1/2"	7-1/2"	plastic	in-line	
4.0	recoil	1"	1/2"	1"	3"	included	aluminum	6"	6"	steel	in-line	nylon
6.6	recoil	1"	1/2"	7/8"	2-7/8"	included	14 ga. steel	6"	8"	steel	staggered	ball
6.4	recoil	1"	1/2"	7/8"	2-7/8"	included	14 ga. steel	6"	8"	plastic	staggered	nylon
4.0	recoil	3"	1/2"	1-1/4"	2-3/4"	included	14 ga. steel	6"	6"	steel	staggered	powdered metal
6.6	recoil	3"	1/2"	1"	2-1/2"	included	14 ga. steel	6"	6"	steel	staggered	powdered metal
6.4	recoil	3"	1/2"	1-1/2"	3"	included	14 ga. steel	8"	8"	steel	staggered	powdered metal
16.5	recoil	3"	3/8"	1"	3"	included	3/20" aluminum	6"	8"	steel	staggered	powdered metal
3.4	rope	3/4"	5/8"	1-1/2"	2-1/2"	included	14 ga. steel	6"	6"	steel	in-line	nylon
6.6	rope	3/4"	5/8"	1-1/2"	2-1/2"	included	14 ga. steel	6"	6"	plastic	in-line	nylon
6.0	recoil	3/4"	5/8"	1-3/16"	3"	included	14 ga. steel	7"	7"	plastic	staggered	nylon

^d minimum thickness

^c mail-order catalogue price; freight extra

(in "list price") by as much as \$10 or even \$15.

Mechanically, the news is this:

- **Starters.** A new and cheaper electric starter comes (as an extra) on eight makes of mowers using Clinton engines. Built by GE, it is a simple induction motor (one moving part) permanently attached underneath the mower. Big advantage: price (\$15 to \$20). Other makers also offer electric starters but these are series motors (involving brushes and commutators), usually cost twice as much as the GE-Clinton attachment. Another starter development is a foot crank (Bolens)—you kick down to yank the cord.

- **Guards.** The rotary mower is a notoriously toe-hungry machine, and a grille underneath the blade seems an obvious and sensible idea. This year Choremaster has one. Look for others to come.

- **Size.** The 18-inch mower is still the most popular, but more and more people are buying bigger models. A few makers expect to sell more 21-inchers than 18s this year, and riding mowers are gaining fast, too.

What's coming? Most improvements in power mowers over the past few years have involved the *mower* part of the machine—housing, wheels, cutting blade. Redesign of *engines* and *engine accessories* is due. Two points are getting concentrated attention right now: starting and noise.

Starting. Clinton (which makes engines only, not mowers) is pushing starter research hard. Besides the little GE electric starter mentioned above, which is now available, it has demonstrated an experimental "impulse starter."

This is a neat and simple gimmick: a spring that you wind up with a handle. When you press the release button, the

spring cranks the engine. Winding the spring takes only a third to a fourth as much effort as turning over the engine with a rope—and you can do it slowly. When the spring unwinds, it cranks the engine twice as fast and twice as long as a hard pull on a rope does, which makes for surer starting.

No price or marketing date has been set for the impulse starter, but it is likely to cost almost as much as the little electric job. Its big advantage: convenience. You can use it anywhere, even when you're chopping weeds on the back 40, far from an electric outlet.

Still another starter is rumored (reliably, but without official confirmation from Clinton) to be ready for introduction by summer. This one uses gas pressure from a little capsule of compressed carbon dioxide (the kind that puts the fizz in home soda syphons). You insert the capsule in the chamber, pull the trigger, and the expanding CO₂ spins the engine. The idea is borrowed from early airplane engines, which used expanding gas from shotgun shells for starting.

Noise. The mowers' roar is a steady background, morning to dark, for outdoor living in every suburb. As soon as one neighbor kills his machine, another starts his. And when you're at the handle of your own, it drowns out every word that isn't shouted into your ear.

What can be done? Several of the powers in the business are deep in costly research programs. They report that 50 percent of the noise comes from the exhaust, 35 percent is air whistling through the intake and the remaining 15 percent represents the clatter of moving parts.

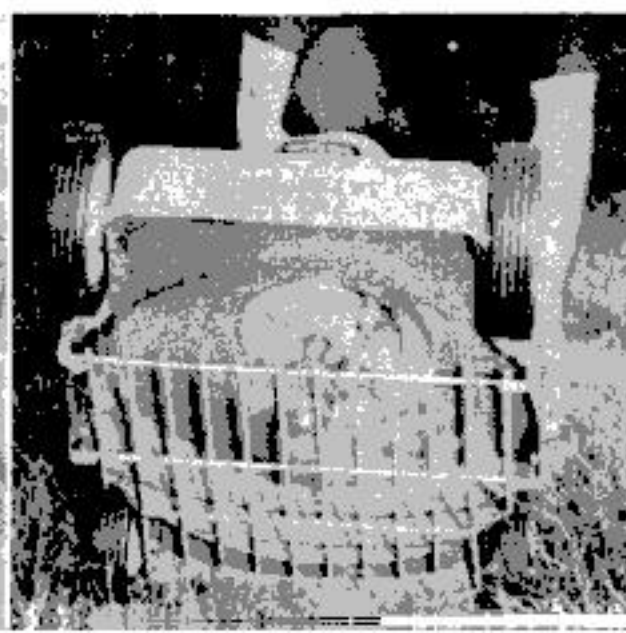
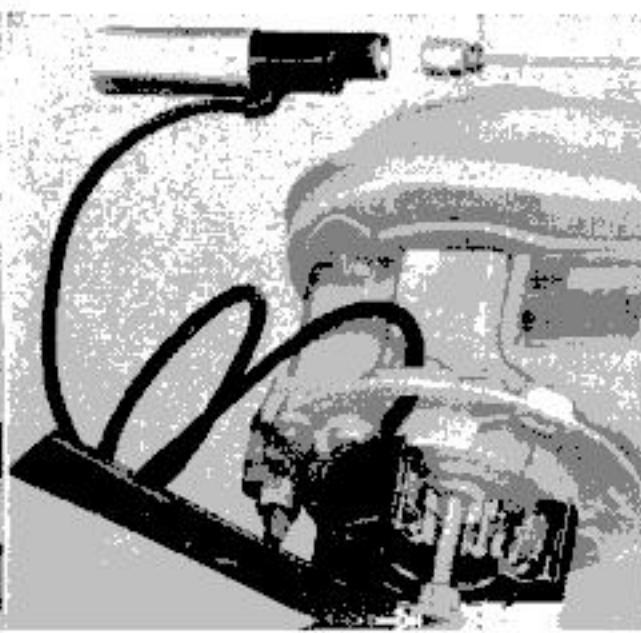
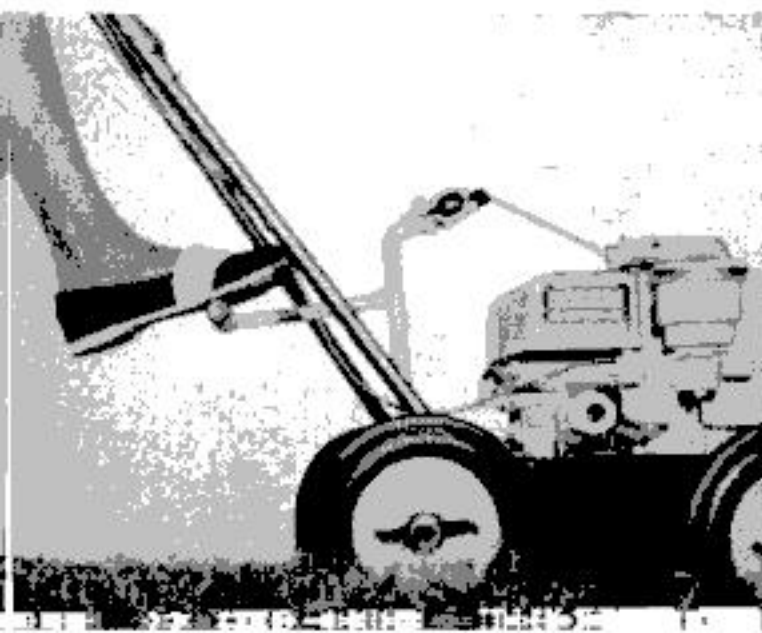
Bigger, more effective mufflers (for exhausts) and silencers (for intakes) are

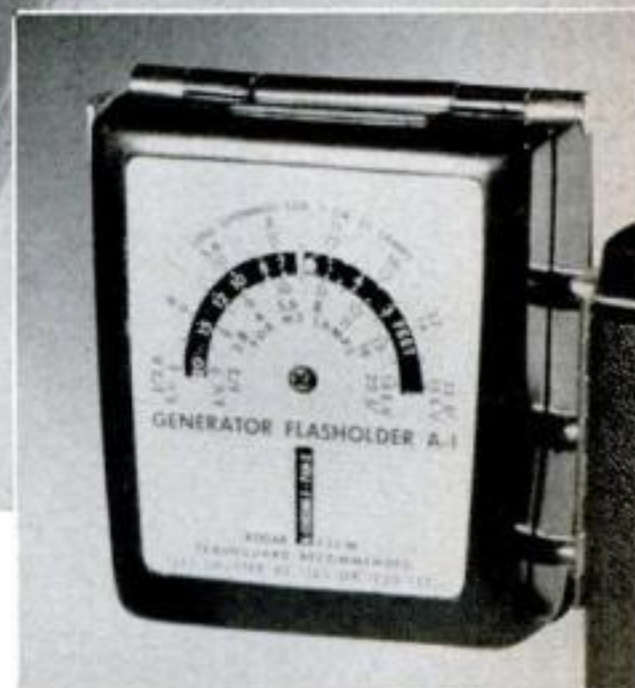
[Continued on page 242]

YOU KICK TO START some of the new Bolens machines. The foot pedal (Bolens calls it Step-O-matic) is a simple crank gripping the handle of the standard type of rewind starter.

LOW-COST ELECTRIC STARTER is offered on some mowers using Clinton engines. Press switch goes on mower handle, starter motor is mounted between the blade and the engine.

SAFETY GRILLE covers rear three-fourths of blade on Choremaster machines. Openings let grass through while keeping all-too-easily-harmed feet away from danger of spinning blade.





FOLDED UP, tiny new flash can fit in a shirt pocket. Dial on back quickly shows the correct camera setting to use for any bulb, film and distance.

No-Battery Flash Generates Its Own Power

ATINY new flashgun that never needs batteries and takes up no more space than a pack of cigarettes will go on sale for the first time this month.

It uses no power packs, chargers or other outside current. You simply insert a flashbulb, spin a small wheel and a miniature built-in generator stores an electric charge in a capacitor. When you trip the shutter, the capacitor lets go its charge and fires the bulb.

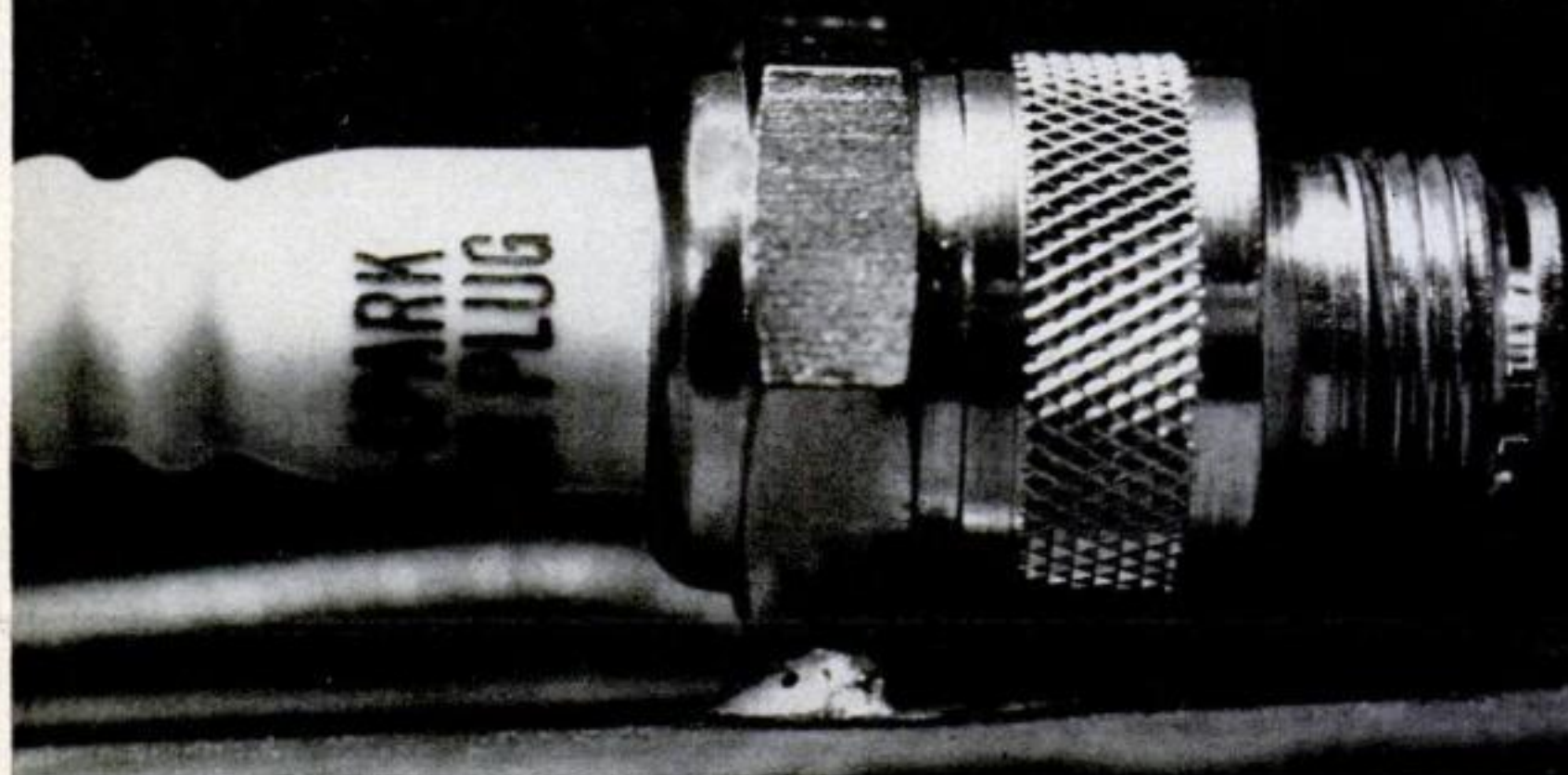
Half a turn of the wheel is enough to fire the bulb, although as many as 50 volts can be built up on several spins. If you decide not to shoot immediately,

the capacitor holds the charge for about five minutes. Any of the standard M-2, No. 5 and N-25 bulbs can be used.

How long will it last? Barring breakage, Eastman Kodak, its maker, says there's no reason why it shouldn't continue to operate indefinitely.

Two models of the new flash are available, one with special pin connectors for some Kodak cameras for about \$14, and one with a standard shoe mount for about \$15 that will fit other makes. A similar pocket-size flash, using penlight cells instead of the generator, is also available for about \$8.

what's new



for your car

A self-gapping spark-plug is said to produce a clean, hot spark without ever needing adjustment. The spark starts arcing at the point of least resistance around the rim of a circular electrode (above, at right). As the gap widens, the spark keeps jumping to new points around the rim, always maintaining the proper gap. Made by Ful-Power Corp., the plugs are available in sets of six and eight for about \$10 to \$14 for each make, model and year of car.



Tire-valve caps with built-in pressure indicators tell you at a glance when your tires are too soft. As soon as pressure drops three pounds, a red button drops out of sight in the end of the cap. Practical Products sells five caps, preset to your desired pressure from 22 to 90 pounds, for about \$4 . . .

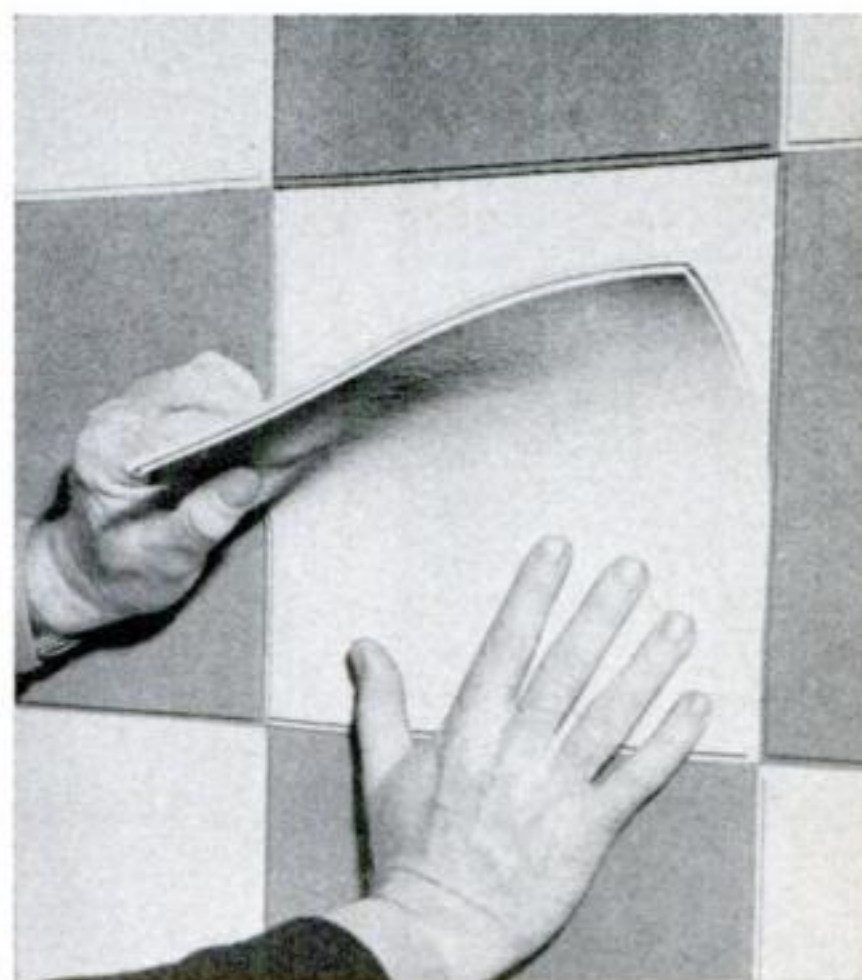
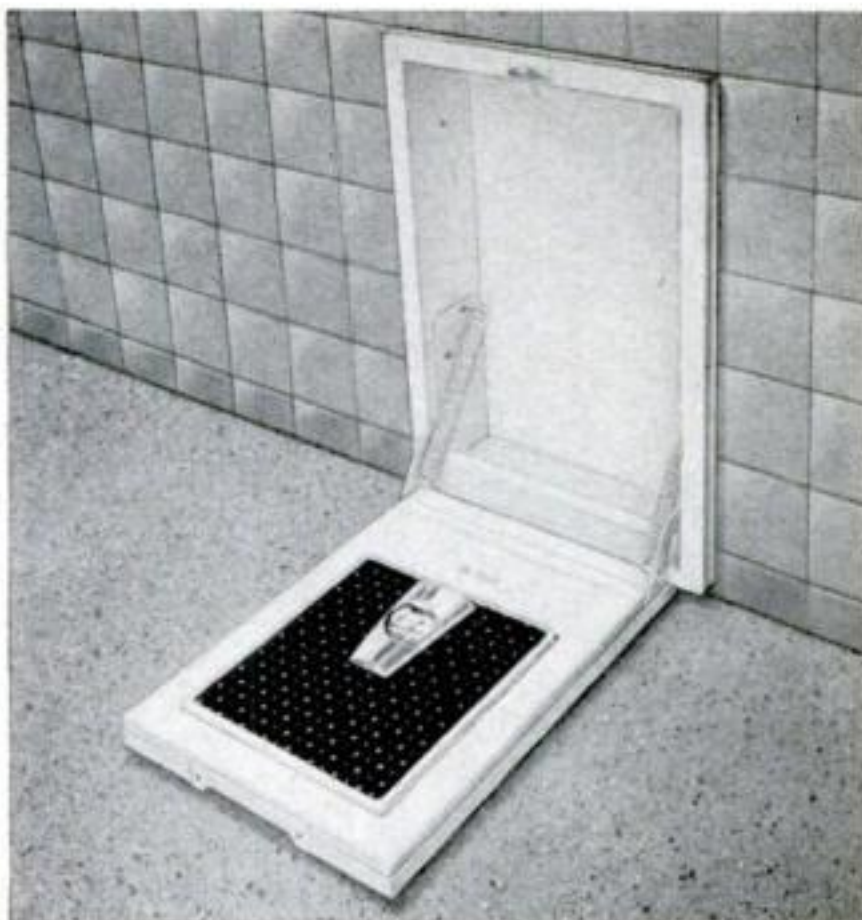
You can spot traffic lights better with a Lucite plastic prism that attaches to the top of your windshield and gives you a wide-angle view upward. It's made by Lite-Site . . . *The dual-purpose auto wastebasket* at left doubles as cold-drink carrier on hot trips. The Wooster Rubber Co. sells the waterproof plastic basket for about \$2 . . . *A rear-seat TV set* that also operates as a plug-in portable on house current is already being tested by Oldsmobile, but won't be available for a while . . . *A Sputnik-proof garage-door opener* has been developed by Alliance in answer to the accidental tripping of a Schenectady homeowner's radio-controlled doors by the Russian "moon." Only the right combination of radio frequency and pulse signal will open the doors.



for your home

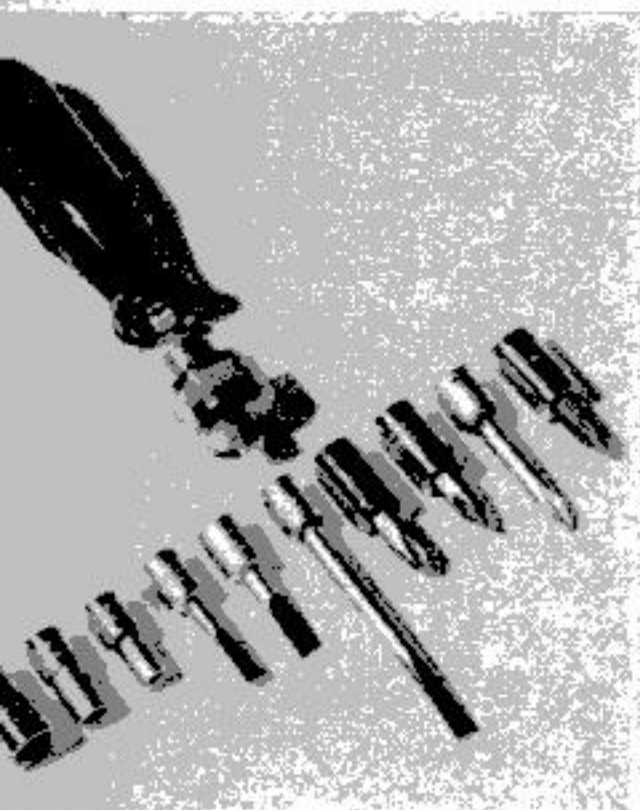
Want the moon? You can have it—or nine other celestial scenes—in blowups big enough to wallpaper a room. Astro Murals, including sun, stars and planets, are available on paper or cloth for pasting to a wall, or as transparencies for backlighting. Sizes range from 2' by 3' for about \$6 to 6' by 8' for about \$34 . . . Returning to earth, NuTone has a new **built-in bathroom scale** that folds out of the way between wall studs when not in use. You can install one for about \$35 . . . Another NuTone newcomer is a **room-to-room wall fan** (something like the kitchen exhaust type) that helps distribute heat or cooled conditioned air between rooms. Price is about \$22.

Two new wall coverings: Marlite's **plastic-faced hardboard paneling** is now available in a perforated type for use with today's popular hook-on fixtures. You can get it in nine colors and many wood-grain and marbled patterns with 1"-spaced holes . . . **New flexible tiles** (bottom, right) add both heat and sound insulation to a room, as well as a fancy decorative effect. Made of a thick, spongy new plastic developed by Curtiss-Wright, the 10" squares come in 12 colors, require only adhesive for mounting, cost about 33 cents apiece . . . **A hot-water dispenser** for quick cups of coffee or tea (below left) is being tested by Youngstown. The electrically heated unit, designed to fit under a kitchen sink, will keep a half-gallon of water piping-hot all day long. It is expected to sell for about \$70.



More new products on the next page

what's new for the home shop



▶ You can add more than 30 different attachments to the ratchet driver shown at left. The $\frac{1}{4}$ " drive takes a full series of socket wrenches, both regular and Phillips screwdriver blades, extension shafts, T handles, spin handles, and a universal joint. The basic Herbrand driver with one bit sells for about \$6 . . . *A screwdriver with a built-in socket wrench* in the handle is made by Vaco Products so you can get at those pesky, slot-less screws found in radio and TV chassis.

Magna has come out with a *new economy-priced multi-purpose Shopsmith* for \$179.90—approximately \$100 less than its big brother. Chief cost savings: three-speed pulley instead of continuous speed changer, single right-hand quill feed, slightly shorter length and smaller work table. Other changes include simplified adjustments and a one-piece out-board fence-support . . . *Want a free propane torch?* You can get one as an extra prize by entering the big Home Improvement Council Contest through POPULAR SCIENCE. Use the form printed elsewhere in this issue to obtain an entry blank or pick one up at a participating hardware or building-supply dealer. In either case, be sure to return the completed entry direct to POPULAR SCIENCE. The Bernz-O-Matic torches will go to the first 500 to get their entries in.

for the home handyman



▶ "*Nail-on bricks*" will soon be available in large sheets (left) that go up fast without the work, weight and cost of real brick. Developed by Redibrick Industries, they're actually thin strips of masonry bonded to panels of insulation board, which together serve as both sheathing and siding . . . Another new *insulated siding* is Alasco's aluminum "clapboards" backed with a $\frac{3}{8}$ " layer of plastic foam. Prepainted in a variety of baked-on enamel colors, they're said to reduce heat loss, end rot, and last indefinitely . . . *New aids for trash cans:* Ecco makes a wheeled bracket that clamps to the bottom of a heavy can for easy rolling. Two other accessories turn an old 55-gallon oil drum into a king-size rubbish bin. Witt Cornice Co. supplies a self-closing, hinged top and a wheeled base; you supply the drum . . . *You can check the balance of a mower blade* by placing it on a plastic cone made by Akay. If the blade tips, you file down the heavy end until the blade is correctly balanced to prevent damage to the crankshaft.

for more information:

Here's where to write if you can't get any item listed above: Akay Corp., 4034 N. Kolmar Ave., Chicago 41; Alliance Mfg. Co., Alliance, Ohio; Alasco, Inc., Siding Division, Akron, Ohio; Anseo, Binghamton, N. Y.; Astro Murals, 231 W. 58th St., NYC 19; Bar-B-Kwik Co., P. O. Box 9146, Long Beach

10, Cal.; A. G. Busch & Co., Inc., 6122-38 N. Northwest Highway, Chicago 31; Curtiss-Wright Corp., Curon Division, 50 Rockefeller Plaza, NYC 20; Eastman Kodak Co., Rochester 4, N. Y.; Ecco Equipment Corp., 2359 N. 6th St., Philadelphia 33; Edmund Scientific Co., Barrington, N. J.; Filnor Products, Inc., 101 W. 31st St., NYC 1; Ful-Power Corp., Indiana Theatre Bldg., Indiana, Pa.; Herbrand Tools, Fremont,

A **spray can with a built-in bellows** (at right) makes it easy to squirt powdered graphite under pressure into locks, hinges and other hard-to-reach spots. The refillable plastic container is sold by A. G. Busch for \$1.25 . . . **Metal brackets for mounting rural mailboxes** are available in two types from Macklanburg-Duncan for about \$1.50. One joins a box to a four-by-four wood post; the other fits a 1½" pipe support.



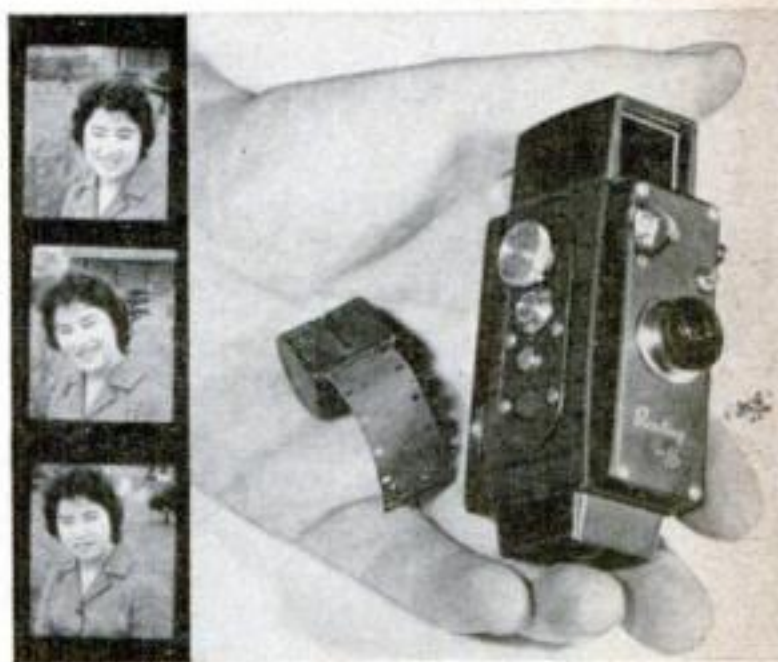
just for fun

You can have a **two-pound, portable tape recorder**, shown at right, for \$26.95. Imported from West Germany, it has a transistor-powered amplifier and runs 15 hours on four flashlight batteries. The "fi" is definitely not "hi" but is adequate for voice recording at parties and on vacation trips. Filnor Products sells it with mike, headphones and tape spools . . . **An electronic organ with its own built-in record-changer** lets you play along with music or instruction records. You can also play the four-speed changer separately. The Thomas organ, with two-octave keyboard, 20-watt amplifier and four-speaker system, sells for \$795.



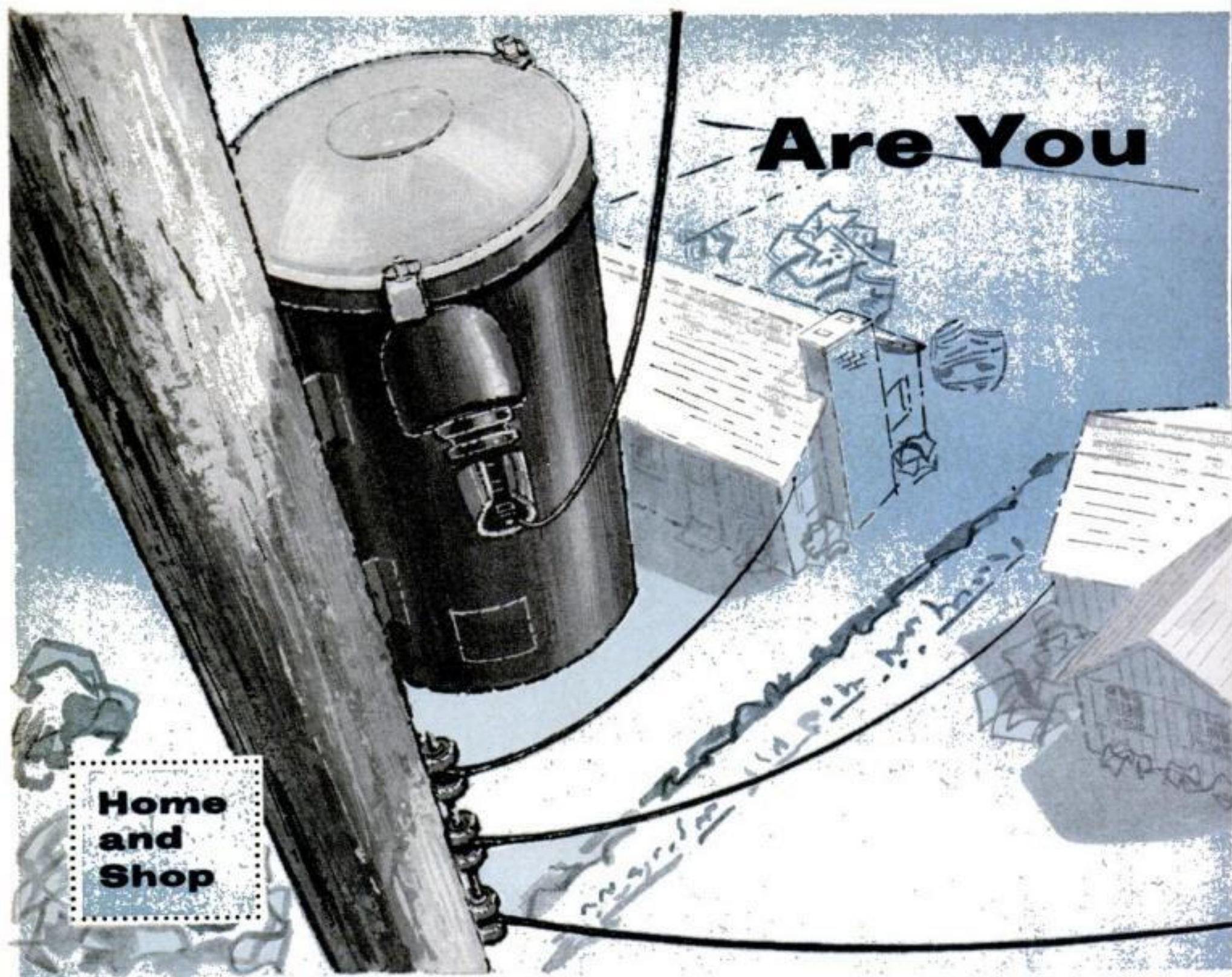
You can build your own **6" reflecting telescope** from a \$12 kit sold by Edmund Scientific Co. It includes lenses and a mirror that you grind yourself . . . **A rechargeable electric razor** for camping trips runs a week on one overnight 115-volt charge. The Royal-Matic shaver sells for about \$30 . . . For quick cookouts, there's a **disposable barbecue** consisting of prewrapped packets of charcoal that fit into a collapsible wire stand. Each Bar-B-Kwik packet and stand costs \$1.25 . . . Eastman Kodak's fancy new **automatic slide projector** flips on a fresh scene every four, eight or 16 seconds and can be backed up manually to any previously shown slide. Price is about \$150 . . . **The miniature fixed-focus camera** at right takes 12 snapshots on standard 16-mm. movie film. Silver Bells imports it from Japan for about \$10 . . . **The fastest indoor color film**, a tungsten version of Ansco's Super Anscochrome, is now available in 120 and 35-mm. rolls. It has a whopping exposure index of 100.

Sheldon Gallager



Ohio; Lite-Site Corp., P. O. Box 21, Tonawanda, N. Y.; Macklanburg-Duncan Co., P. O. Box 1197, Oklahoma City 1, Okla.; Magna Power Tool Corp., Menlo Park, Cal.; (Marlite Paneling) Marsh Wall Products, Dover, Ohio; NuTone, Inc., Madison & Redbank Rds., Cincinnati 27; Oldsmobile Division, General Motors, Lansing 21, Mich.; Practical Products Mfg., Inc., 6566 W. 88th Pl., Los Angeles 45; Redibrik

Industries, 351 Ottawa Ave., Holland, Mich.; Royal-Matic Shaver Co., 5541 S. Ashland Ave., Chicago; Silver Bells Ltd., 1637 Del Monte Blvd., Seaside, Cal.; Thomas Organ Co., Division of Pacific Mercury Corp., Sepulveda, Cal.; Vaco Products, 317 E. Ontario St., Chicago 11; Witt Cornice Co., 2110 Winchell Ave., Cincinnati 14; Wooster Rubber Co., Wooster, Ohio; Youngstown Kitchens, Salem, Ohio.



By Erik H. Arctander

A FRIEND of mine heats his vacation cabin electrically with radiant panels. After five trouble-free years, the glass in two of his three panels shattered within a week's time.

Another friend's wife complained that her new washer didn't spin clothes dry enough. One morning, when a heavy load was spinning, wisps of smoke and a burning smell drifted out of the machine. The repairman prescribed a new motor.

In neither case was the electrical equipment at fault. Over-voltage wrecked the heat panels, under-voltage burned out the washer motor. The over-voltage was caused by a hike in the power company's system voltage. The under-voltage was caused partly by undersize house wiring, partly by low power-line voltage.

How could such things happen? These expensive accidents made me wonder what

power companies and appliance makers could tell me. Are they working together to see that we get long and efficient use from electric appliances?

The first thing I discovered was that 110 volts is rare in homes today. For the past 30 years line voltages have been creeping upward. Lack of a firm standard has been one cause; power-company economics, another. The economics is simple: Higher voltage lets you push more power over the same lines. The alternative is an expensive new transmission system.

Putting a lid on volts. In 1949, the Edison Electric Institute (representing utilities) and the National Electrical Manufacturers Association (appliances) got together to standardize voltages. The joint committee chose 120 volts as the ideal residential voltage to aim at. Deviations, inevitable in power distribution, were to be kept within a "favorable zone"—between 110 and 125 volts.

Getting the Voltage You Pay for?

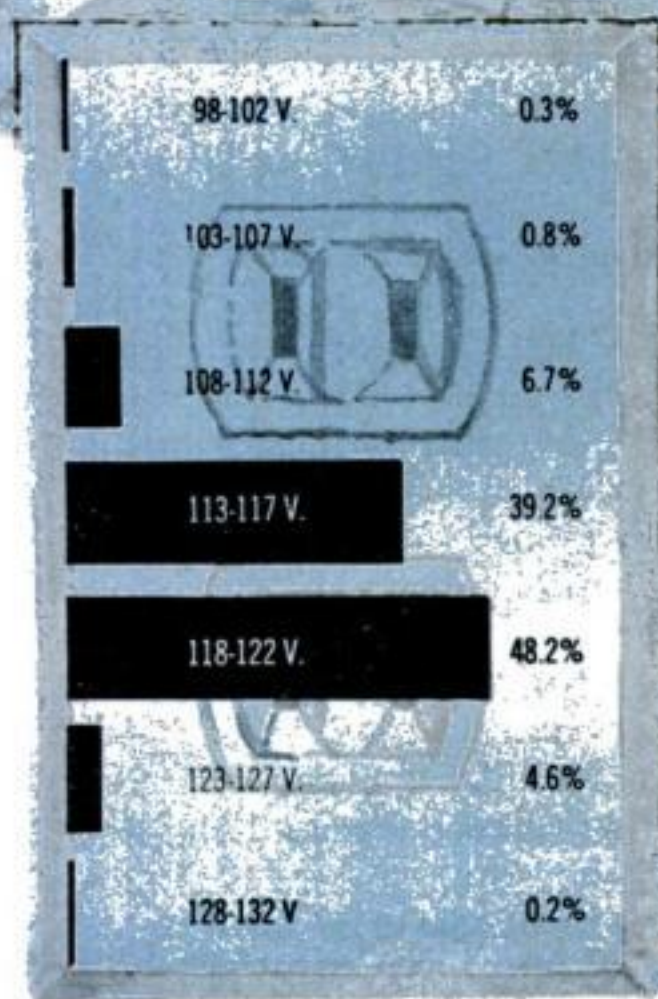
Many householders don't. You'll want to know the ways too much or too little can cause trouble

Unofficial estimates by experts in the power field indicate that a large majority of all U.S. wired homes are thus supplied. The number will increase as old power-company equipment is replaced.

The same joint committee decided on design voltages for each type of electrical device. If an appliance doesn't get exactly the voltage it's designed for, performance won't be ideal. But within 10 percent (plus or minus) you may not notice the difference. A bigger spread than 10 percent can cost money, cause trouble.

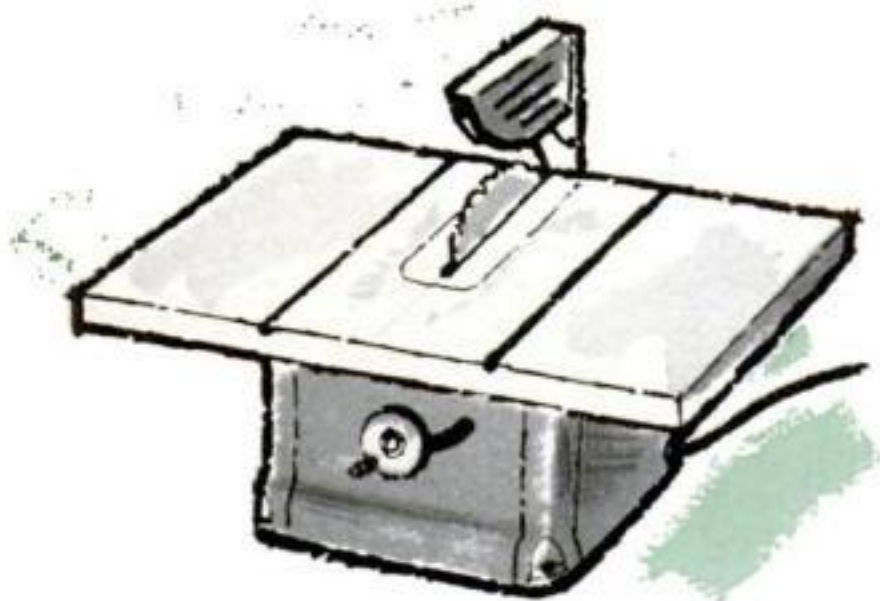
Proper nourishment of your electrical equipment depends on several things:

- What nominal system voltage the power company maintains.
- Whether you live in a large city or in a suburban-rural area. The largest cities have "networks" whose cross-connections ensure steadier voltage than the usual radial systems.
- Whether you live in a commercial or



WHAT VOLTAGE HOMEOWNERS ACTUALLY GET is indicated in these results of a survey by General Electric's TV Receiver Dept. Wall outlets in 13,000,000 homes, supplied by 64 different power systems, were meter-tested. Survey shows that an overwhelming 87.4% of homes tested have between 113 and 122 volts; the once-standard 110 volts has almost vanished.

What the wrong voltage can do to your appliances.....



MOTORS

RATED AT A LOW 115 VOLTS because under-voltage with a heavy load can burn the winding insulation, ruining a motor. Just a 10% under-voltage (103½ volts) saps starting and running torque by 19%. Moderate over-voltage is not serious, it merely increases the torque.

industrial section served by heavier wiring. Good at night, maybe not so good by day when flickers and surges are caused by heavy changing loads.

- How close your house is to the line transformer serving it. Voltage is apt to be above normal near the transformer, may be below normal at the line's far end.

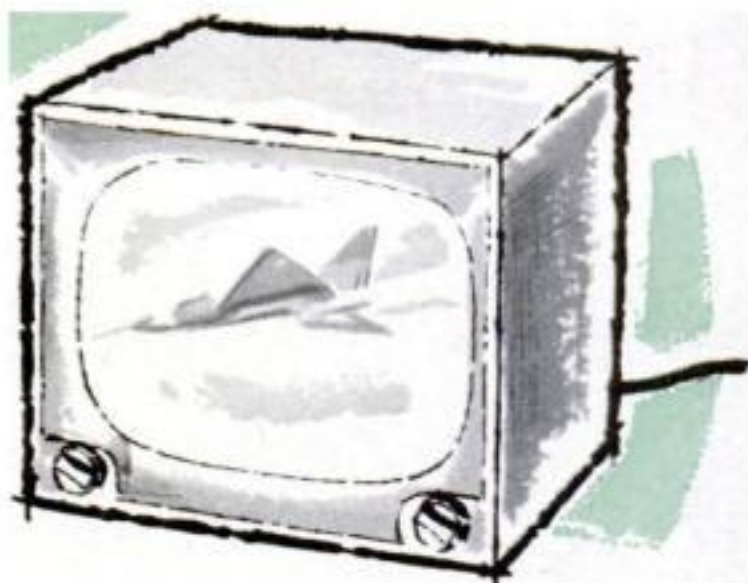
- Time of day and season of the year. Heaviest daily power use: five to 10 p.m. In the North, demand peaks in winter; in the South it peaks in summer (air conditioners). Heavy loads cut voltage.

- Condition of your house wiring. A two- to three-volt drop between the entrance panel and a distant outlet is considered reasonable; more of a drop indicates undersized branch wiring.

Uniformly poor performance from your lamps and appliances is the surest tipoff to improper voltage. Dimming bulbs, laboring motors, slow-acting heaters indicate under-voltage. Bright bulbs needing frequent replacement and too-hot heating elements point to over-voltage.

You can doublecheck under- or over-voltage symptoms with an AC voltmeter. Plug the test prods into a wall receptacle and read the line voltage. Remember, though, that small meters can be from two to five percent off. And one reading probably won't be typical; better take a series spread through the day.

The remedy for over-voltage rests with



ELECTRONIC DEVICES

RATED AT A MEDIUM 117 VOLTS because under- and over-voltage are about equally bad. Under-voltage shrinks a TV picture (a 10% drop causes a 10% shrinkage in picture area), cuts brightness, sensitivity. Over-voltage shortens the life of picture tube and vacuum tubes.

the power company. Wall outlets that consistently deliver over 120 volts are cause for complaint. Power companies have been held liable for damage resulting from improper voltage supply.

Curing under-voltage, if house wiring is at fault, usually means putting in a new entrance service plus 12 to 16 new branch circuits. There's a much cheaper stunt that may work almost as well. Run one extra-heavy line (a "sub-feed") from the existing entrance service to a new panel box near the main current users—usually this means the kitchen.

Each major kitchen appliance is wired, on its own individual circuit, to the sub-feed panel box. So is a cluster or two of wall outlets for small portable gadgets. This relieves the original circuits of all but lighting duties. Voltage drop at the appliances is small because of the heavy subfeed wire and the short runs on each appliance circuit.

You can carry a second subfeed to the top floor, too, if air conditioners, attic fan and bathroom heaters are piling on a heavy load. One builder actually wires new houses with two entrance panels—one in the kitchen, another in the bedroom hall. Each panel box supplies both 120 and 240 volts.

Without any new wiring you can still prevent an appliance motor from burning up. Most motors come with a thermal cut-



LIGHT BULBS

RATED AT A HIGH 122 VOLTS because over-voltage burns them out quickly—a voltage 10% too high slashes bulb life by 70%. But 10% under-voltage lops 30% off the light output of an incandescent lamp. Fluorescent tubes are not so much affected by improper voltage.

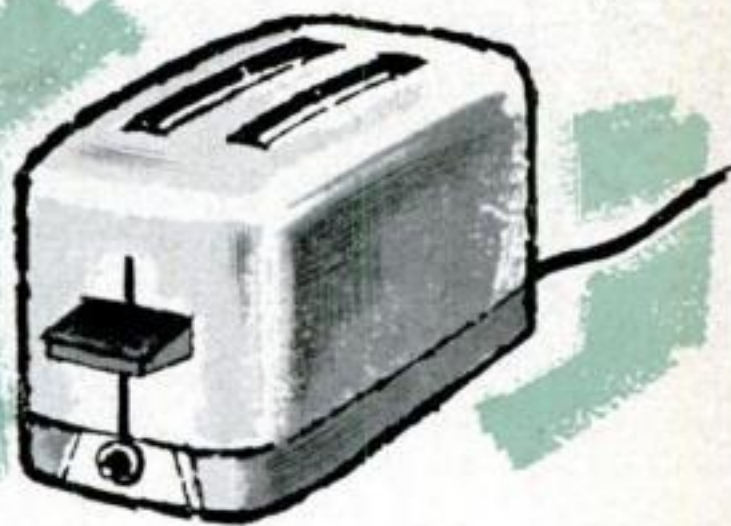
out attached to the case; this opens the circuit if windings draw too much current. Motors lacking a cutout can be plugged into special outlets with a replaceable fuse inside. These inexpensive outlets are easily installed.

When power-company service is suspect you can find out by asking the utility to hook a recording voltmeter on the entrance service. The instrument makes a continuous voltage record for several days. Spot checks might be misleading because of temporary load variations.

What the utility company can do: The power company has simple antidotes for local cases of poor voltage. One of the simplest is to shift taps on the transformer serving your line. Most pole transformers have four 2½-percent taps—two below and two above the system voltage. Changing taps can drop or boost your voltage either three or six volts, roughly.

Where under-voltage can't be remedied this way, the utility may install shunt capacitors or supplementary voltage regulators on the line. The next, most drastic, step is to build more feeder lines to divide the load into smaller pieces.

What you can do: Service-minded companies take random load readings on their branch lines when on jobs in a neighborhood. But if service calls are infrequent, big load jumps may go unnoticed. You can help by notifying them



HEATING ELEMENTS

RATED AT A MEDIUM 118 VOLTS because over- and under-voltage both cause problems. Too much dangerously overheats radiant heaters, broilers, toasters. But 10% under-voltage cuts heat output roughly 19%; thermostat-controlled devices just take longer to reach working heat.

when an electric range, central air conditioner or other heavy current-user is added. A load increase of 5,000 watts or more should be reported.

It pays, too, to locate your transformer by following the power line back to it. Many pole transformers have a red light that goes on when a momentary overload hits the line. It stays on until shut off by a service man. If the overload persists, a circuit breaker cuts all power. So a call to the company when you spot a red transformer light can often prevent an "outage" and improve voltage supply to your house.

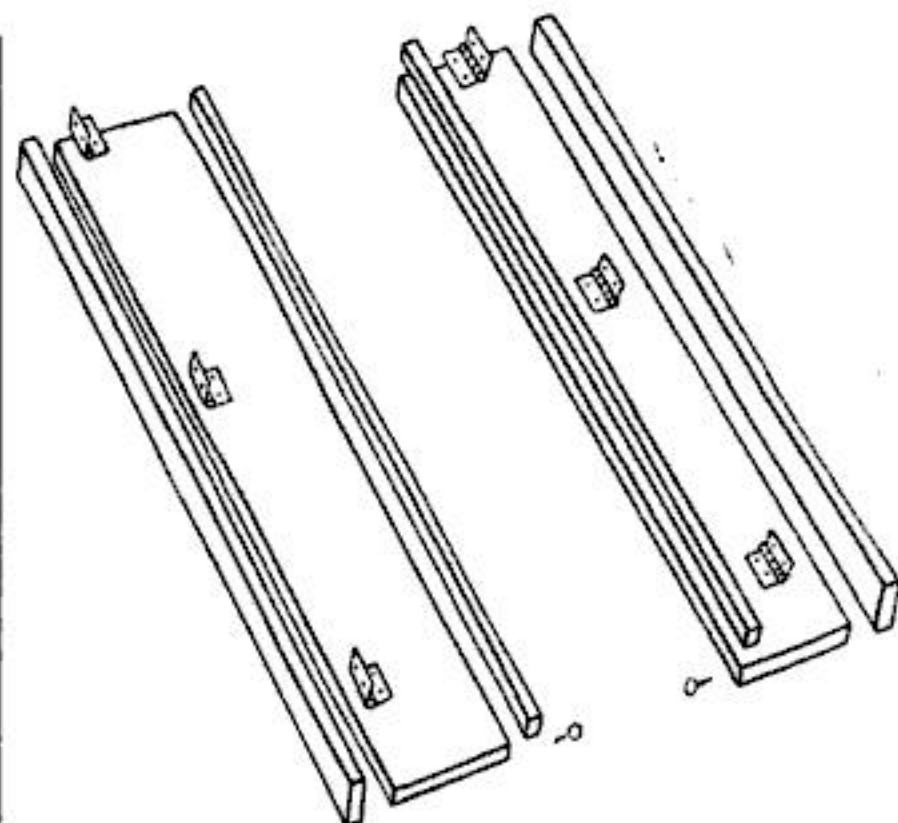
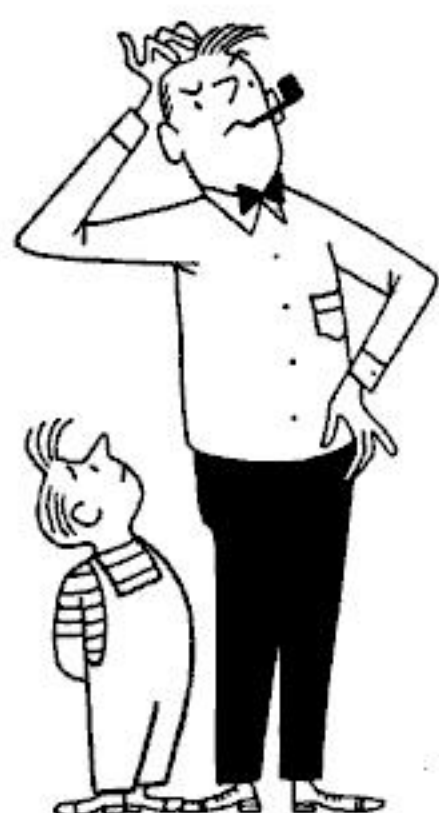
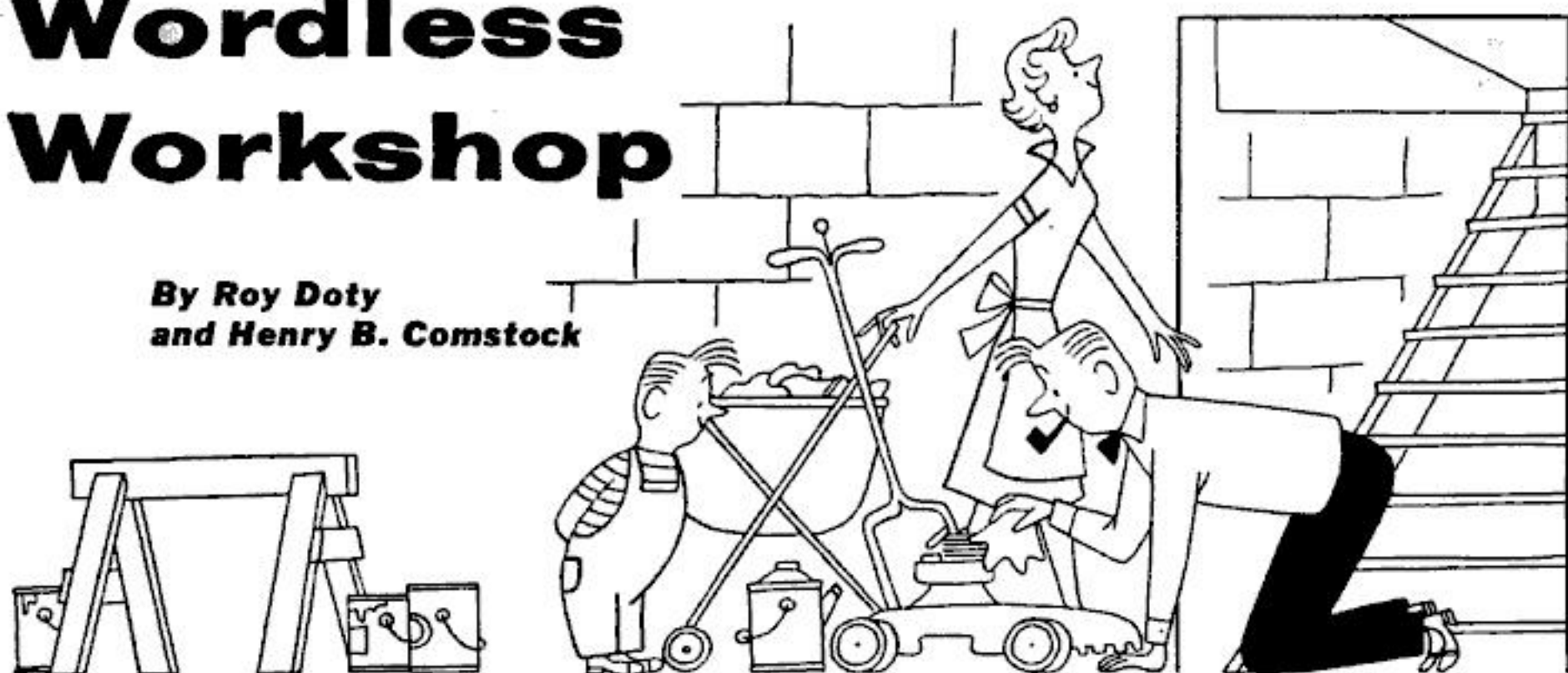
Voltage changes. Sometimes quality of voltage supply suddenly improves or deteriorates. A flock of new appliances in neighbors' homes can chop some volts off. And service can go either way if the utility rearranges feeder lines so that you are closer or further away from the transformer. This sort of shuffling is most likely when new houses tap in nearby.

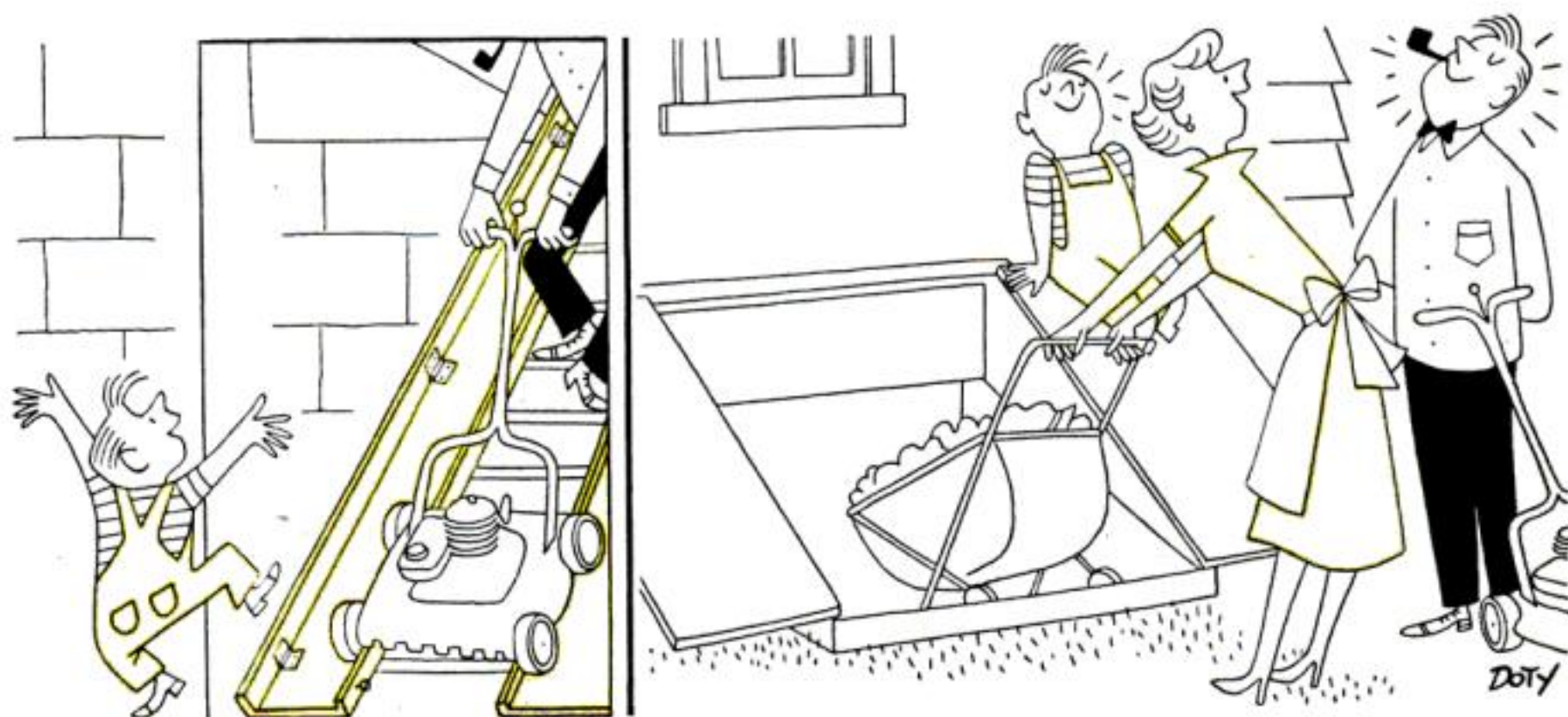
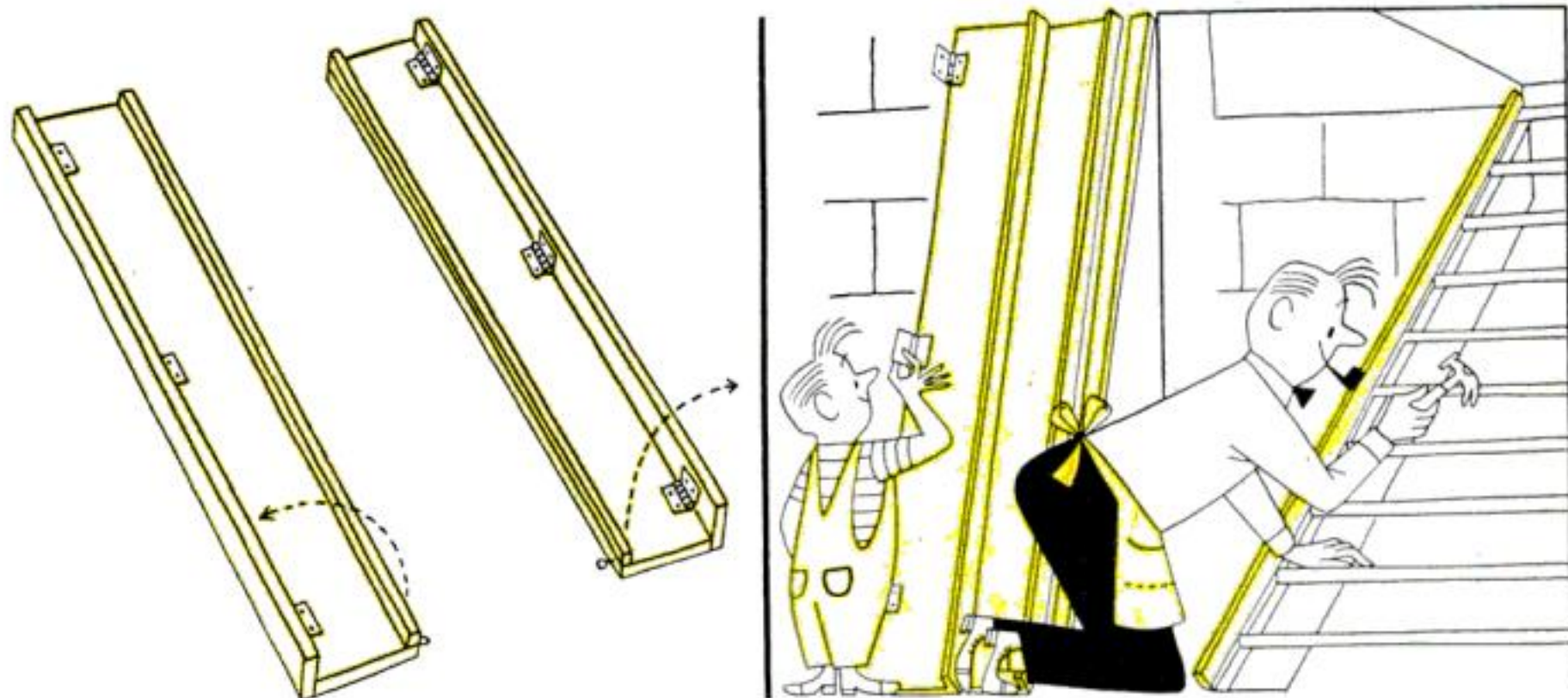
There is a way to divorce yourself from the power company's problems. You can install an automatic voltage regulator at the panel box. An auto transformer called Inductrol will supply the house with a steady 120 volts, even if the supply is a nominal 110 volts with swings of up to 12 volts either way. But one big enough to handle a 100-ampere service costs a whopping \$870!

END

Wordless Workshop

By Roy Doty
and Henry B. Comstock

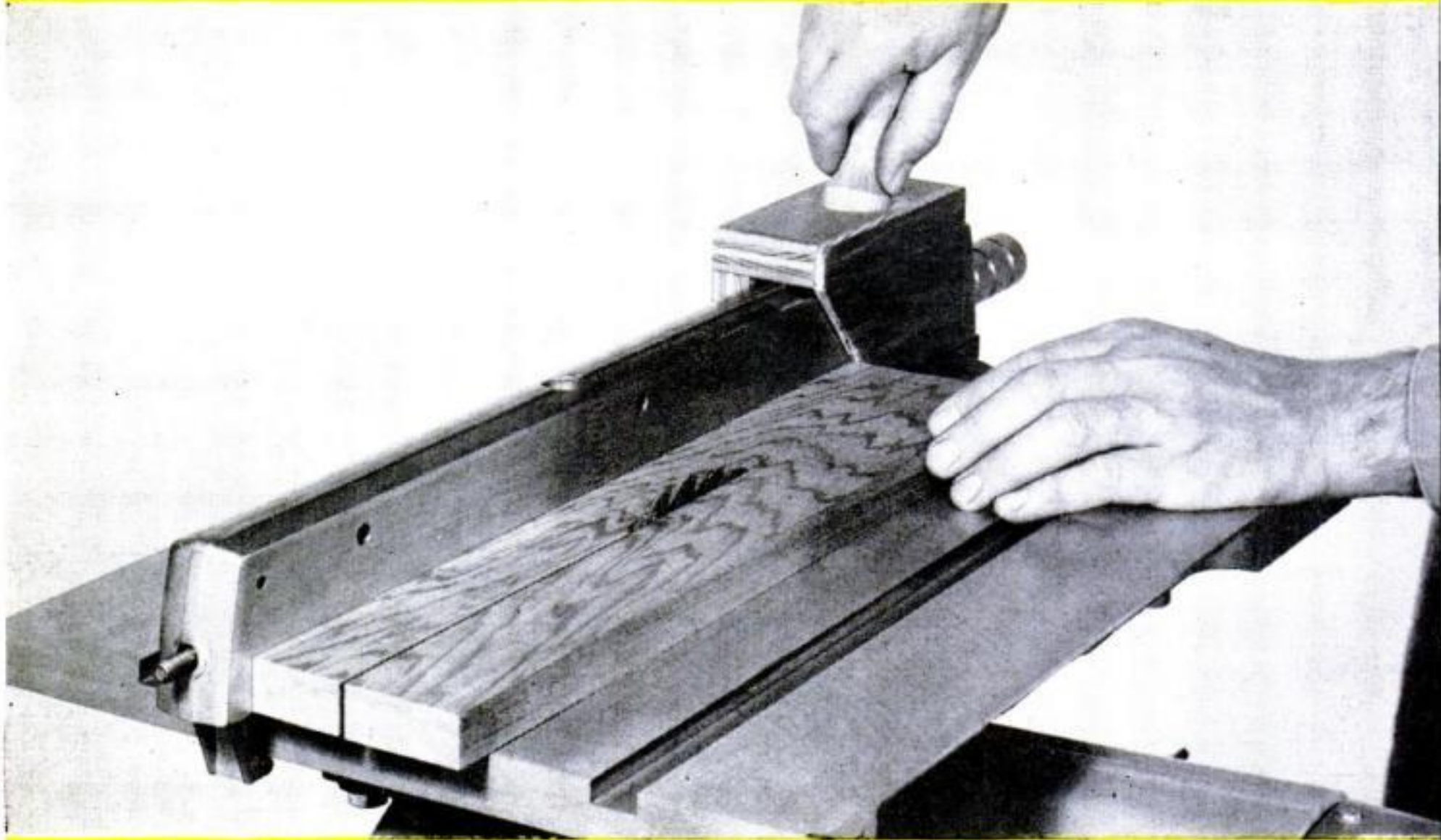




Next Month: A gate-latch alarm to keep kids safely corralled

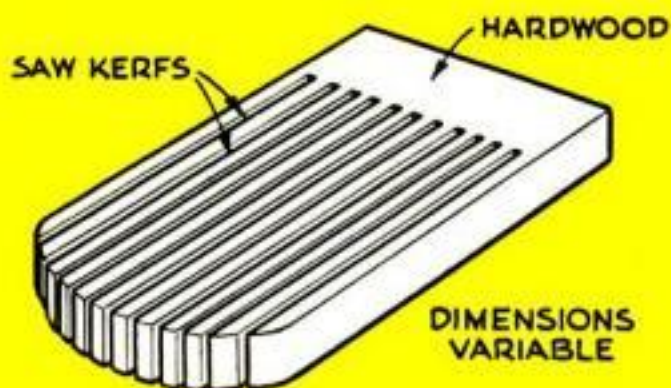
APRIL 1958 169

6 Table-Saw Extras

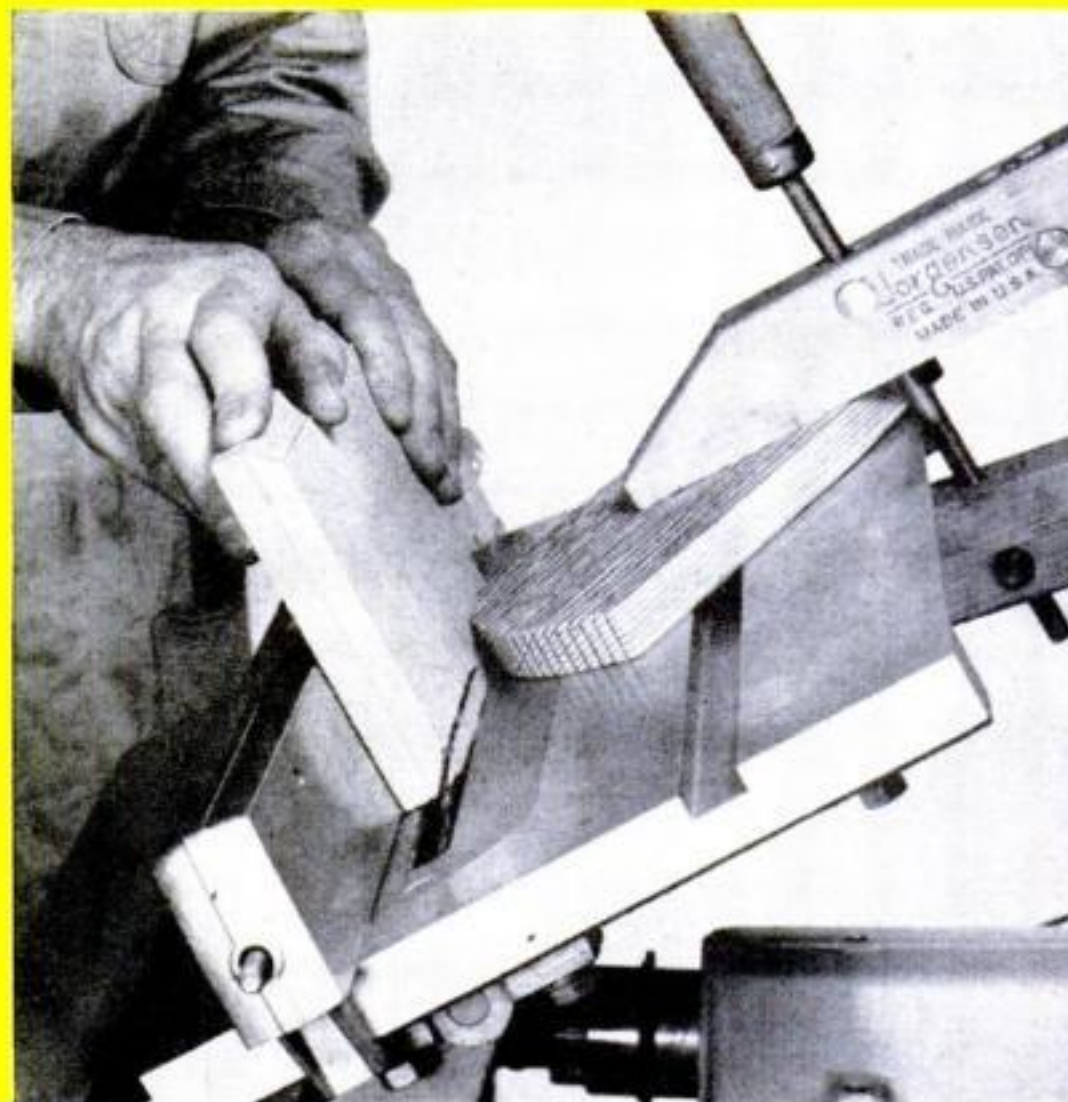


1 RIP-FENCE-STRADDLING PUSH STICK is handy for jointing, shaping and edge-rabbeting (the bias lead edge of the $\frac{1}{4}$ " section prevents the stock from lifting). Make this and other table-saw extras from straight-grained wood or plywood as protection against warping.

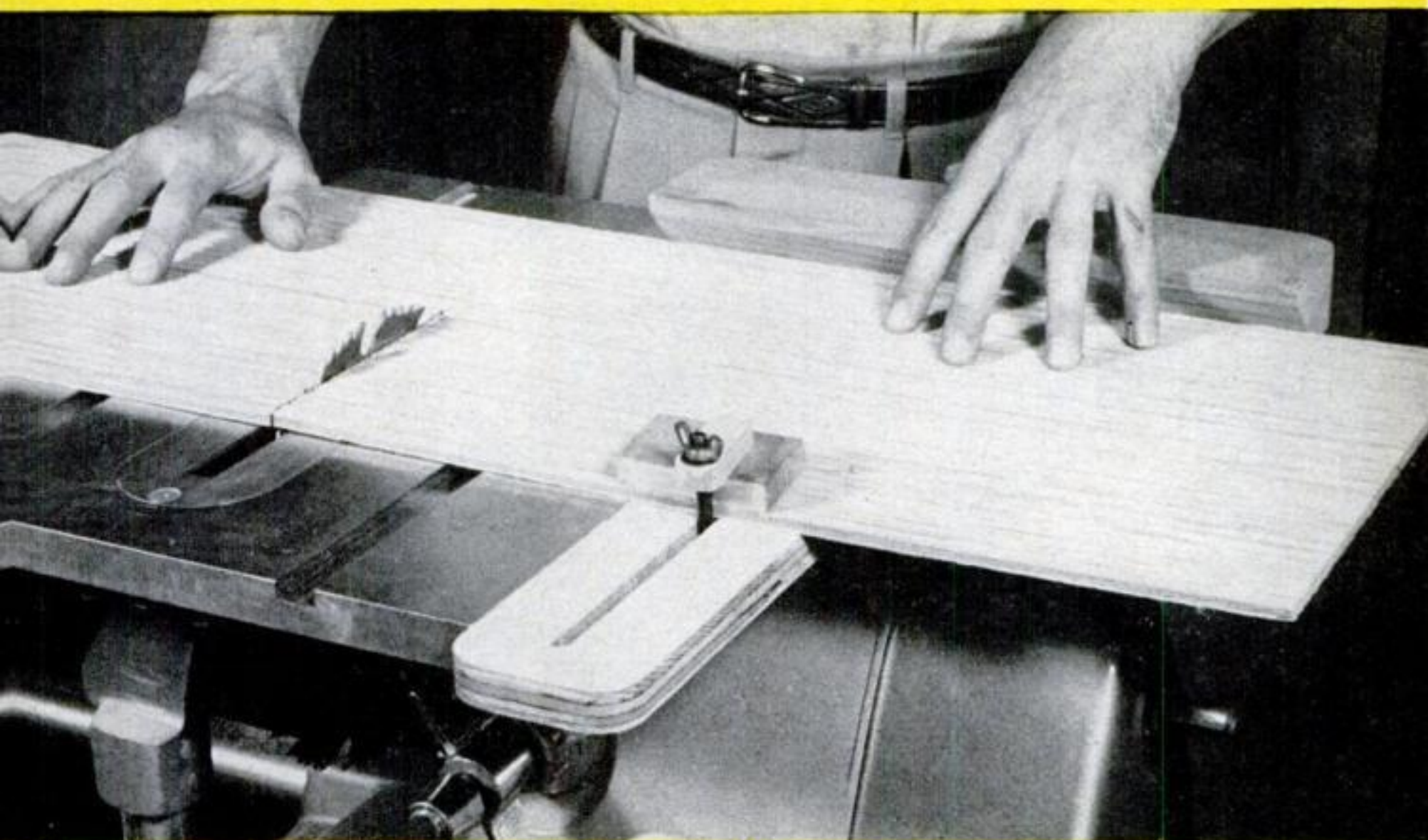
OTHER DIMENSIONS
TO FIT RIP FENCE



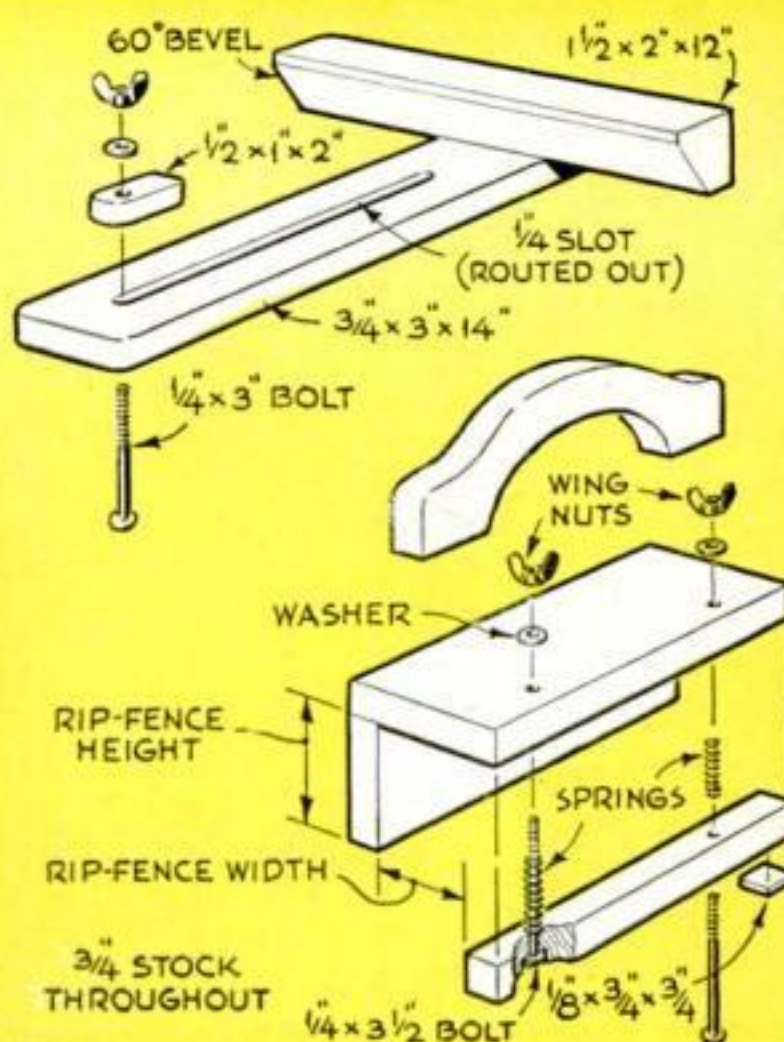
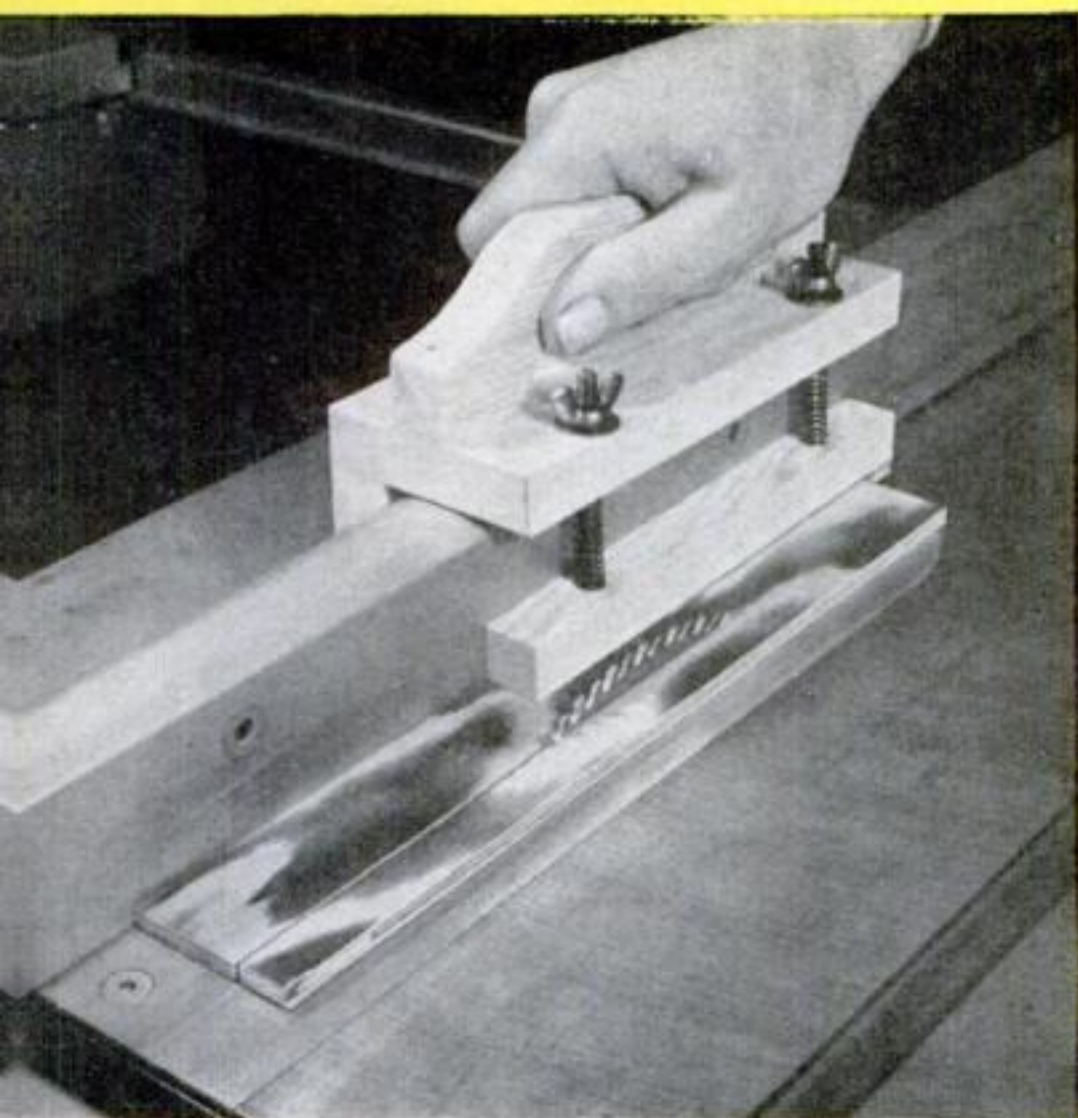
3 SPRING STICK is a horizontal hold-down which forces work firmly against the fence, without binding, for bevel-cutting and other delicate jobs. Make its evenly spaced "fingers" with parallel cuts of the saw, and clamp it to the table as shown.



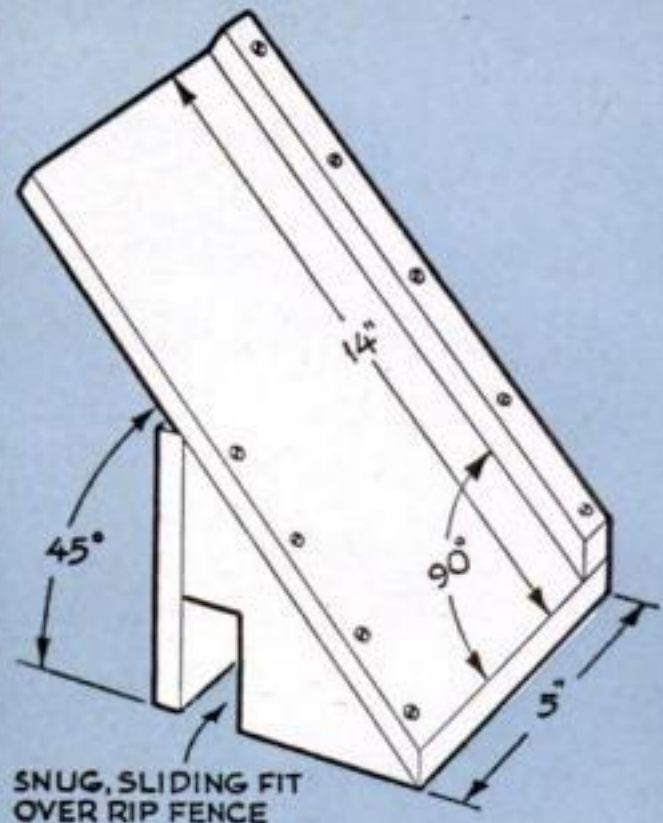
That You Can Make



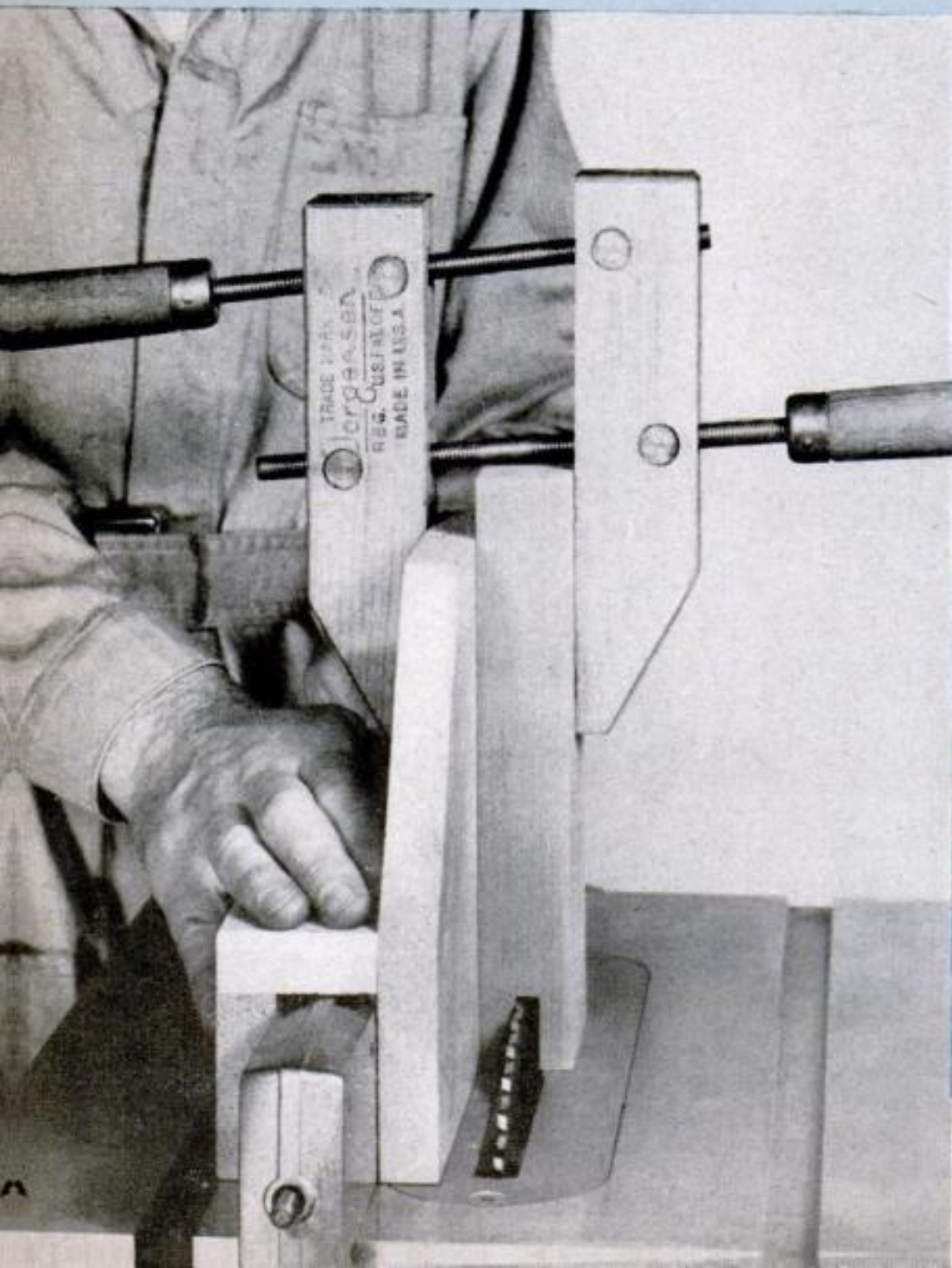
2 CROSSCUTTING GUIDE AND CLAMP holds down large panels and boards the safe way while you advance them into the saw. Make sure that the blade is always pressed firmly against the saw-table edge. Use scrap wood under the clamp to protect stock surfaces.



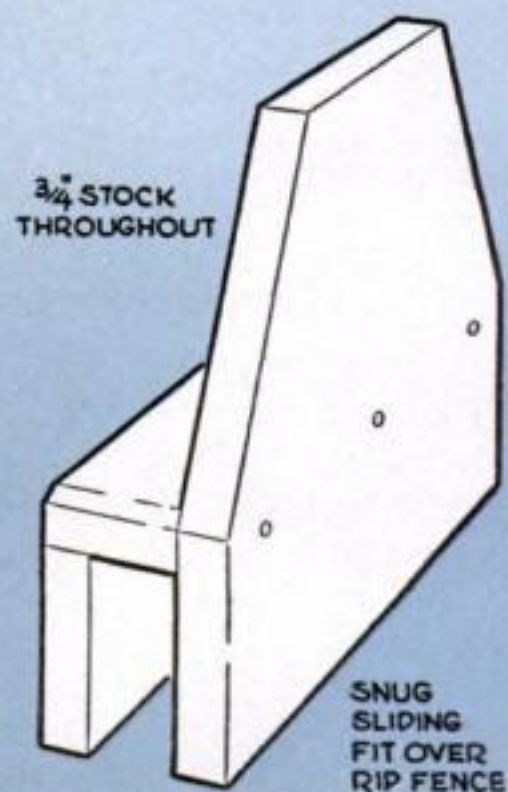
4 SPRING-LOADED HOLD-DOWN is useful for cutting narrow stock, or stock of variable thickness. It can be adjusted to the job by setting wing nuts for proper tension. Use four coats of shellac—the first thinned with alcohol—to finish all table-saw extras.



5 CROSS-MITER JIG. If you have a bench saw with a tilting table, this jig will save you the inconvenience of loosening and realigning it for 45° cuts. Clamp stock trimmed to size on the jig, which straddles the fence, and push the whole unit past the saw blade.



6 SLOT-AND-TENON JIG provides a firm support, to which work can be clamped vertically for end cuts. Use this handy accessory either with a dado, or with an ordinary blade and a rip fence, resetting the fence as often as necessary to provide the right slot width.





Want to slash building costs? Then be your own contractor. Here's how:

You Can Pocket the Contractor's Profit

By John L. Springer

MUSCLE can build a do-it-yourself house, but the labor costs you save won't necessarily make it the best bargain. A survey by a maker of pre-cut lumber reveals that people who shop for the best prices in *materials* and in *hired* labor actually may come out ahead of the do-it-all-yourselfers.

That's what I did. By acting as my own contractor I made about eight dollars an hour—far more than I could have

made working as my own carpenter.

Here's an example. The first men I consulted asked from \$2,300 to \$2,800 for the plumbing work. I took a day off, got other bids. The result of my one day's work—getting a new estimate of \$1,800—saved enough to pay a carpenter for a month.

Here's how I saved money—and how you can follow suit.

Hiring sub-contractors. Look around for specialists. Among carpenters, for instance, you will find workmen who do

To save money as your own contractor, plan your work

You may be smart with a hammer, nails and a saw, but using brawn instead of brain doesn't build the best house. Why earn your home in the sweat of your brow? Here are ways of getting the job done with fewer dollars—and fewer calluses on your hands.



Schedule your work so that each expert can go right on the job without wasting time.

one specific job better, faster, and cheaper—such as installing dry walls and ceilings, laying oak floors, putting in locks and other hardware, building stairs, installing garage doors, weather stripping and windows.

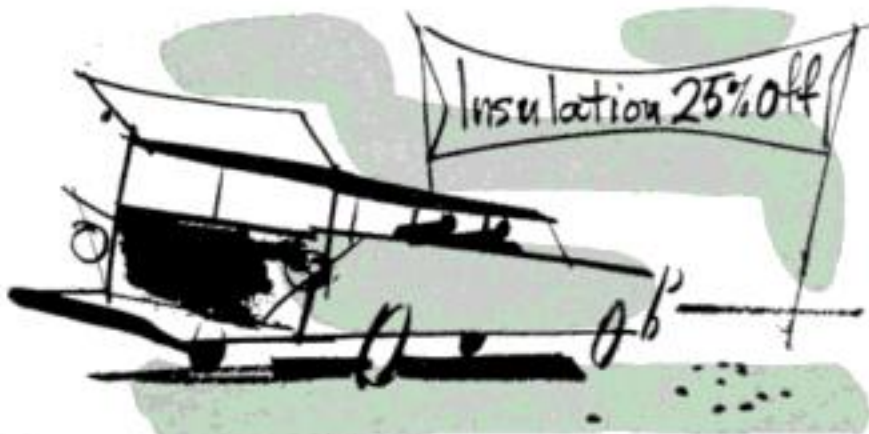
There is the case of my neighbor who hired one carpenter to do the whole job of finishing off an attic. Getting his gypsum board into place on walls and ceilings cost 11 cents a square foot. The jack-of-one-trade that I hired charged only a nickel a square foot.

Anyone building a new house can easily locate contractors who do good work at reasonable prices. Drive around until you find construction being put up by a man who has a reputation for building good houses at low cost. Note the names of contractors on signs nailed in front or on the trucks. That's how I ran across a stair-builder with a shop about 25 miles away whose estimate was 35 percent lower than that of a local man.

Many home builders hire labor by the day. Whether you can save by doing this depends on how competent the workman is. If you have to stand over him all day to make sure he won't goof off, it's not worth it. My experience was that it's better to hire a contractor to do a job at a fixed price. The clincher was when I hired a crackerjack mason by the day.



Look for specialists, like these workmen who put up dormers expertly and fast.



Buy your materials off-season. Insulation is cheaper in the summer, lumber in winter.

Half the time he was mixing mortar, lugging concrete blocks and doing other jobs that could have been done by a laborer making half as much. A contractor would have earned his profit by seeing that the mason did only the skilled work.

Borrowing money. Like most home builders, you probably will have to arrange for a building loan from a bank to pay for labor and materials as your house is being built and before you get a permanent mortgage.

In my case the bank agreed to make payments at various stages of construction—after the foundation was in, when the roof was on, after rough utilities were installed and the inside walls could be put up, when I was ready for interior painting, and when the "C.O."—certificate of occupancy—was issued stating that the house was safe to live in. The bank charged a hefty interest rate—one half of one percent a month—from the moment it made each payment. But you don't have to request a payment until you need the cash. You can wait for payments until the end of a month, and then pay your bills before the 10th of the following month, taking advantage of the two-percent cash discount allowed by most suppliers.

Scheduling work. Every day's delay in work cost me about \$3.00 in interest



Pay for the *job*, not by the *hour*, so a skilled man won't draw high pay for common labor.



Borrow from the bank only as you need the money. Interest payments can pile up.



Use labor-saving material such as four-by-12-foot plywood panels. Watch hourly costs.



Store materials out of sight, under lock and key if possible. Don't risk thieving.

charges and taxes. That makes it important that contractors come in, do their jobs, and get out with the least delay.

After a house is rough-framed and studs for the interior partitions are in place, the plumbers, electricians and heating men can pile in. After they complete roughing-in for utilities, the insulation goes into place, and then you're ready for plasterers or wallboard installers. Get commitments from contractors as to when they can come on the job and when they can leave. That lets you make up a work schedule to save time and money.

This sounds easier than it actually is. To be on the safe side, allow leeway at both ends. Say the electrician promises to begin work on a Monday and says that he will need three days to do the rough wiring. Figure that he might come a few days late or take longer. Therefore it is best to schedule the next step—installing the insulation—for a week or so after the electrician says he will start.

Actually there were only nine major stages that I had to keep in order: 1, the foundation; 2, rough carpentry, which ended with the roof on and interior partitions up; 3, roughing-in of utilities (electricity, plumbing, heating); 4, insulation; 5, interior walls (gypsum wallboard or plaster); 6, laying the finish flooring; 7, tiling bathrooms; 8, decorating inside; 9,

finishing installation (toilets, light fixtures, heating registers, etc.). Most of the other jobs—laying the driveway, painting the outside, installing gutters and leaders, etc.—can be done at any time.

When I tell other home builders that I had no serious trouble with contractors, they shake their heads in disbelief. I've heard of houses lying idle for weeks waiting for a heating man to do an hour's work so that the plasterers could follow him up. All I know is that keeping in touch with the contractors—and being reasonable about minor delays—worked out for me.

Buying materials. The design for my house came from a plan book. It was produced by a top-notch registered architect who sold four sets of blueprints—the number required—together with a specification sheet and a list of materials, all for \$35. Dozens of architects sell plans by mail for about the same price.

One surprise was when I found that I could buy construction lumber, shingles and other materials for a single house at prices only a little higher than those paid by builders of 50 or 100 houses at a clip. There is quite a bit of competition for an individual's business. (Why not? My lumber bill was about \$6,000.)

Incidentally, big lumber shops pack a truck to make the lumber easy to han-

.....
Next Month: The fourth article in *Popular Science's* series *Before You Buy or Build* will give you the facts and figures on prefabs.

Prefabricated houses offer you choices from cottage to mansion. Before you buy or build, you will want to know about them. What are the advantages and disadvantages of each type? What are the specifications to look for? In May, *Popular Science* will answer these and many other questions about one of the most exciting developments in home building.

.....

dle. Floor joists and sub-flooring that you will use first are on top of the pile, two-by-fours for wall studding are next and ceiling joists at the bottom. When lumber is stacked properly you can save half a day's work of sorting it and digging out the pieces you need first.

It is better to underestimate than to overestimate quantities of materials. I learned the hard way. When my carpenter needed a small piece of two-by-four, did he look for a scrap piece? Of course not. He took a perfectly good eight-foot length and sawed off what he wanted—leaving another scrap. If there had been no long two-by-four around, he would have picked up a smaller piece.

Another saving is to buy materials out of season. For example, insulation and heating equipment are generally marked down as much as 25 percent in the summer. Cement, lumber and plywood are lower-priced early in the year and gradually cost more as demand builds up during the late spring and summer. If you have the storage space, you probably can cut your house-building bill by several hundred dollars.

Cost-cutting techniques. A contractor's bidding price depends to a great extent on the number of man-hours required. Using materials that need the least amount of time to put up pays dividends.

Some materials do a spectacular job of keeping labor costs low. Plywood panels up to four-by-12 feet, for example, can serve as exterior wall and roof sheathing and sub-flooring. My carpenter told me these big plywood sheets cover an area in half the time required to install one-inch by six-inch boards.

Plywood, hardboard or other panels

used as both exterior wall sheathing and finished outside wall surface also save a carpenter half the time he would take to put up sheathing and then double back with shingles or siding. Many builders are using a combination roof-deck material that serves as finished exterior roof surface, insulation and finished interior ceiling surface.

Before beginning work, sit down and figure out ways to keep costs low without sacrificing quality. One man I know, planning to use wall-to-wall carpeting, laid $\frac{3}{4}$ -inch plywood as sub-flooring and by-passed the finished flooring. The saving by using only sub-flooring just about paid for his carpeting. Instead of using expensive tile on the walls of his bathroom, he used a good grade of plastic-surfaced wall paper.

Safeguarding materials. Some professional builders write off 10 to 15 percent of material cost to loss and pilferage. If you store lumber, cement and other supplies outdoors, it's almost certain that a local character will consider it his privilege to put together his own remodeling project with your stuff. The only way to beat chiselers is to get everything out of sight. Put doors on the garage as soon as possible and store materials there. A basement is another good hideaway.

Sand and gravel I stored outdoors took another kind of beating. First, youngsters climbed the piles and kicked the stuff all over the lot, then heavy rains washed it into the soil. So: Buy only about a week's supply at a time.

Front and back doors put up so they can be locked at the earliest moment is another safeguard. One neighbor-builder locked those doors too late—after two bathtubs had been stolen.

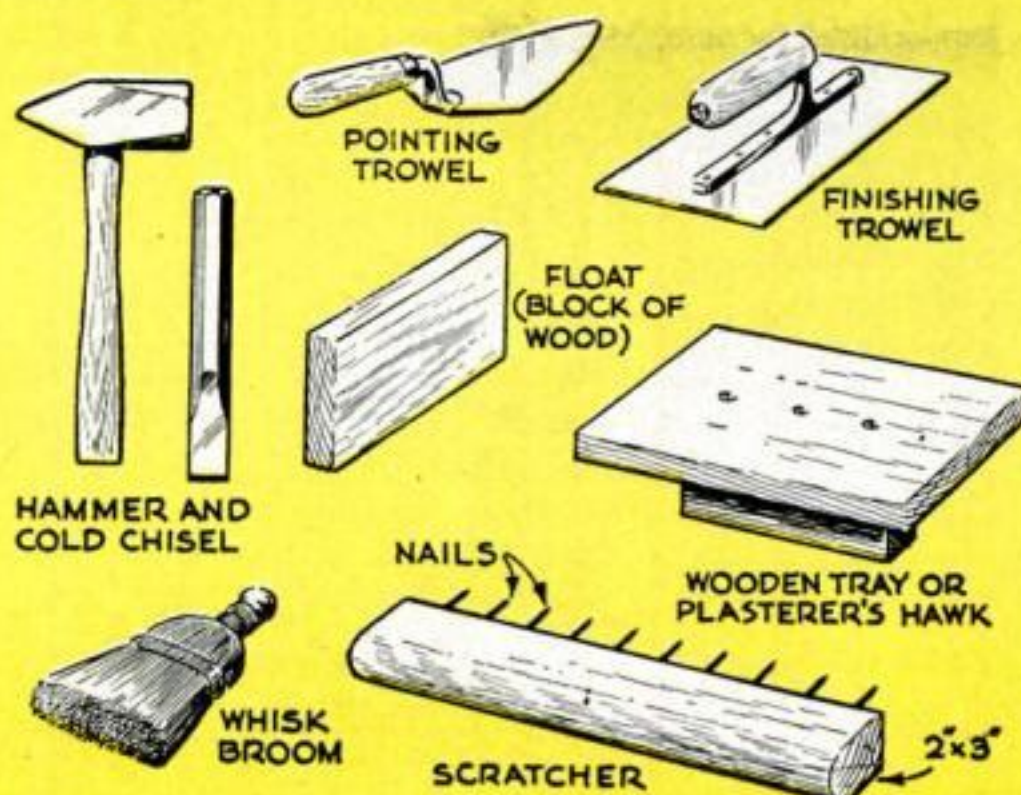
It all adds up. When my house was completed I had appraisers estimate its actual value. Even with my full quota of mistakes, the house cost me 20 percent less than its appraised value. END

Live in a stucco house? Then you'll certainly want to clip and save the helpful repair information on the following two pages. It's part of a series on common household repair jobs appearing monthly in *POPULAR SCIENCE*.

Next Month: Casement windows.

Popular Science Fix-It File

THE TOOLS YOU NEED



THE RIGHT MIXES

FOR CRACKS

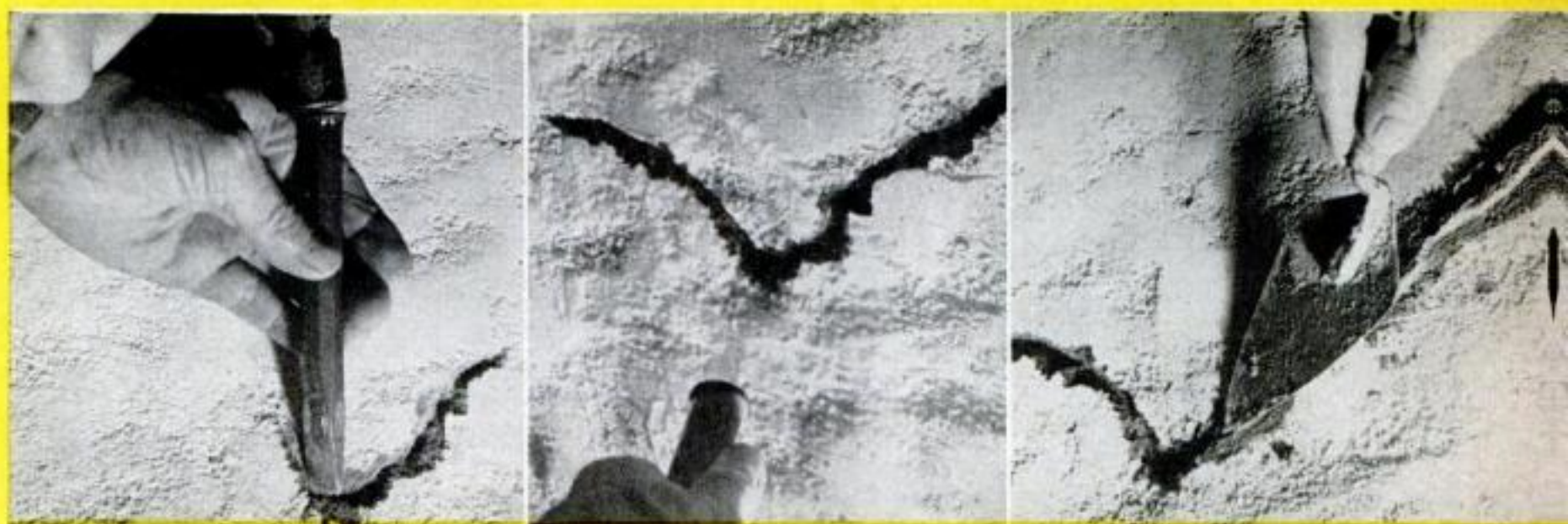
1 part portland cement;
2 parts medium-fine sand.
(Add powdered pigment
if color must be matched.)

FOR LARGE AREAS

1 part "plastic" portland
cement, or 1 part port-
land cement plus $\frac{1}{4}$ part
hydrated lime; $2\frac{1}{2}$ parts
medium-fine sand.

Use this mix for the
scratch, brown and finish
coat. Add pigment to the
last of these three coats.

How to repair cracks



CHISEL THE CRACK OPEN and down to solid stucco, undercutting the edges so new stucco will adhere firmly. Brush out all loose stucco with a whisk broom and dampen area with a

fine spray of water. This insures good suction. Press new stucco into crack with a pointing trowel. When it starts to set, strike off the excess flush with the wall surface.

How to patch large damaged areas

CLEAN OUT DAMAGED AREA with chisel and brush, and fog-spray with water. Trowel in a coat of stucco about $\frac{1}{4}$ " thick. When stucco starts to set, roughen surface with a block of wood to insure a good bond for finish coat. Keep moist with occasional spraying for two

days; then let cure for a week. Just before applying finishing coat, fog-spray the surface again. Always draw finishing trowel upward, holding it at slight angle shown. Apply firm pressure for complete contact with the undercoat. Keep patch moistened at least two days.



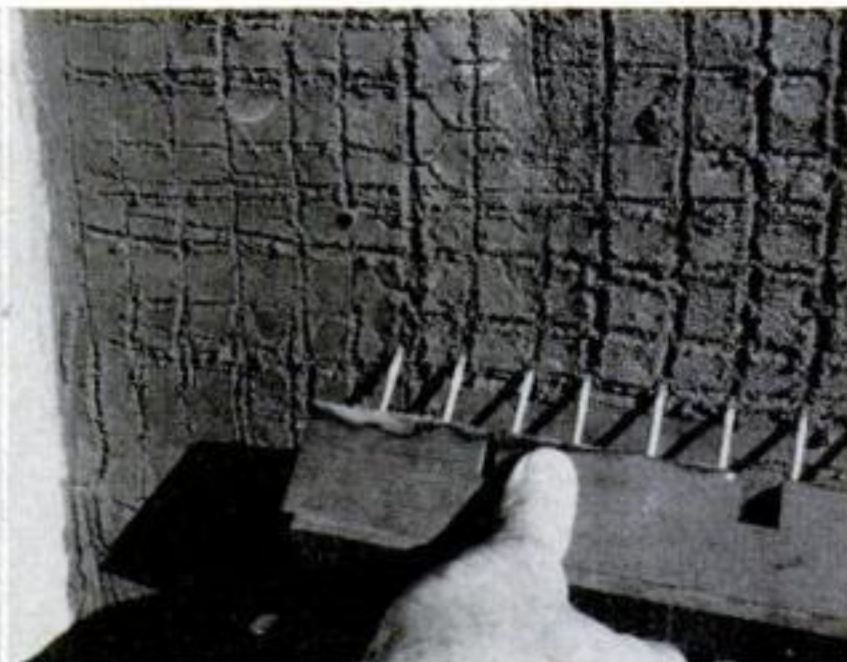
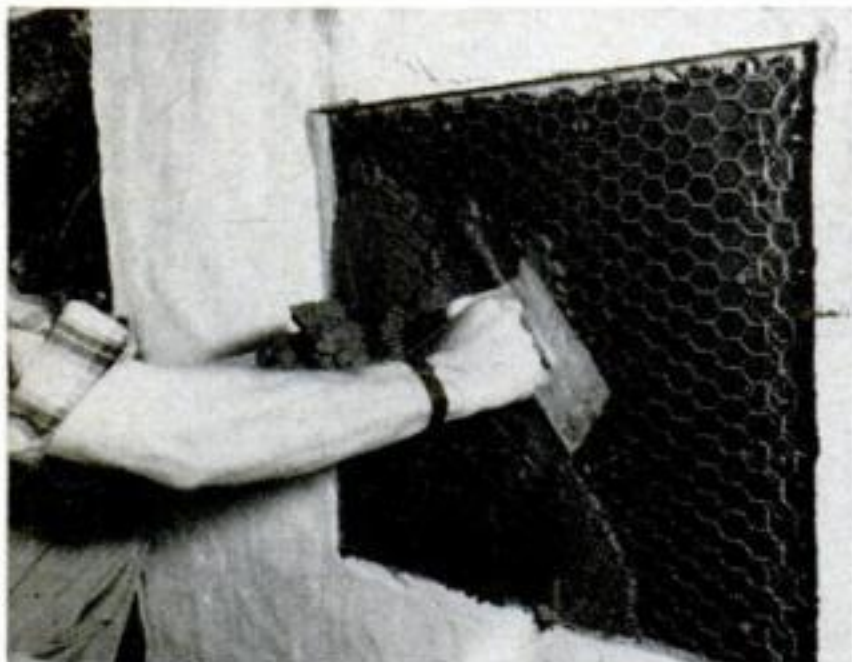
How to make corner repairs



APPLY TWO OR THREE COATS, depending on fill area. Use the wood block to back up one face of each undercoat as you press other face home with pointing trowel. Roughen surfaces of undercoats and let them cure slowly. Apply

finishing coat with a large board held firmly against one wall face for a form. Stucco should be as "stiff" as possible—use only enough water for a cohesive mix. Keep finishing coat moistened for two days or more.

How to cover windows and doors



FILL IN THE AREA to within $\frac{3}{4}$ " of surface with sheathing nailed to a stud frame. Cover with waterproof building paper, sealing joints with waterproof cement. Apply 1"-mesh stucco-

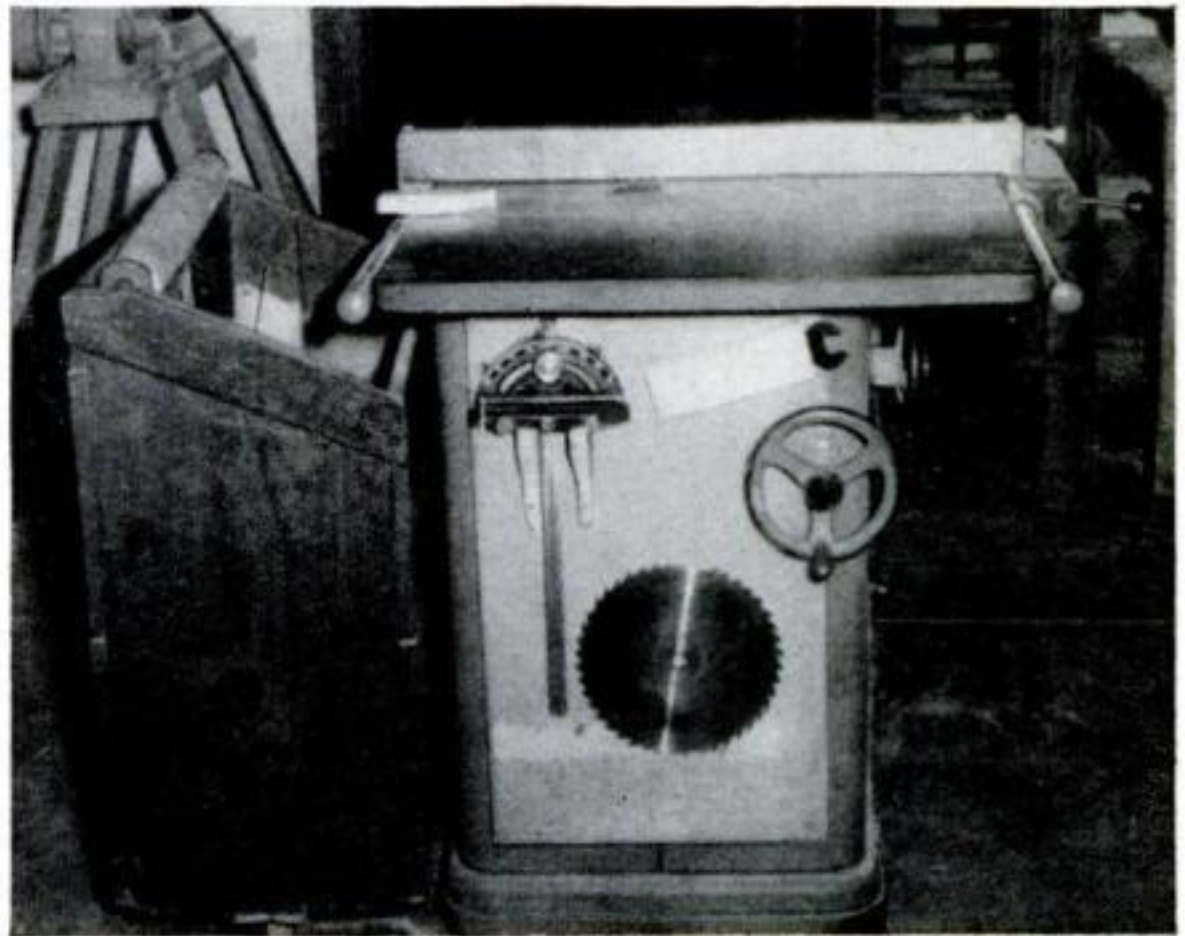
reinforcing wire, using stucco nails (fiber washers hold wire $\frac{3}{8}$ " away from sheathing). Apply scratch coat, roughening it as shown. Nails in scratcher are about 1" apart.



FOLLOW THE SCRATCH COAT with a "brown" coat, building it out to within $\frac{1}{4}$ " of wall surface. Roughen it slightly with a wood block to insure a good finishing-coat bond.

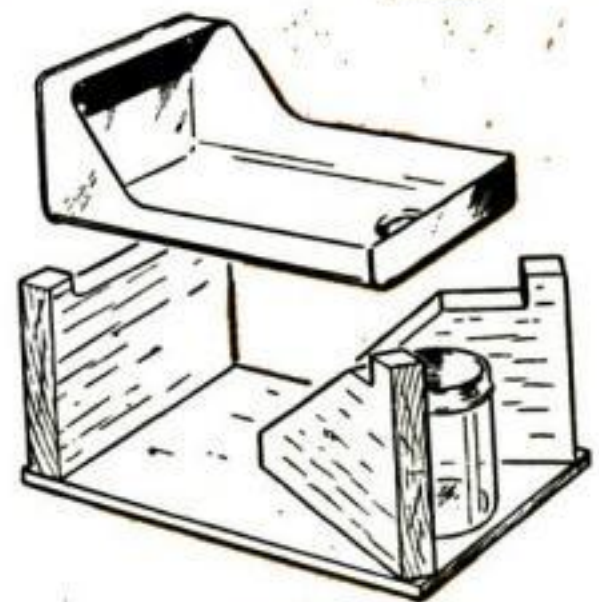
ON WALLS you'll paint, the finishing coat need not be color-matched with pigment. To match a white-sand stucco finish that calls for no paint, use the same type of sand in the mix.

The POPULAR SCIENCE Shop Notebook

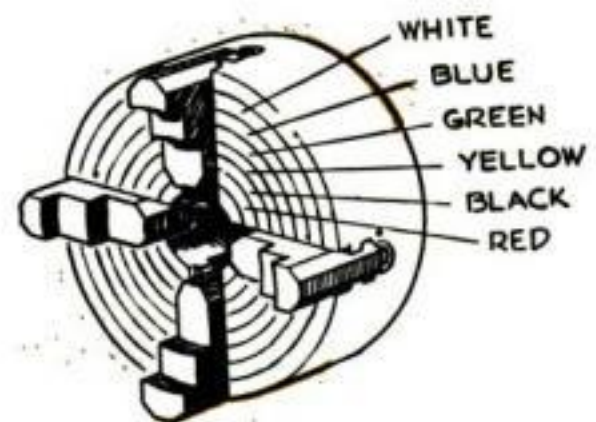


You'll get double service from this table-saw accessory—a scrap bin that catches small pieces of cut-off, and provides a support for ripping long boards. For best results, the top of the roller should be $\frac{1}{4}$ " below that of the saw table. This way it will support long boards when the bin is moved back from the saw, but short stock will override it when the bin is in its scrap-catching position right up close to the back of the table.
—Robert S. Tupper, Canton, S. D.

Small-parts sorter made from a one-gallon can and scrap wood speeds up the chore of getting nails, screws, washers and the like into the right containers. Fold over the sharp edges after cutting the can to shape, and use a ball-peen hammer to depress the edges of the hole cut in its bottom. Make the base uprights high enough to accommodate whatever size jars or other containers you use.



To help you center work quickly in an independent lathe chuck, paint concentric rings of different colors on the chuck face. It takes but a moment to move the jaws into the color ring nearest the desired setting. Then make your final, precise adjustment with the help of an indicator, or with a piece of chalk.—Fred F. Wegener, Indianapolis, Ind.



Emery board used for manicuring makes a good jig-saw sanding stick when you trim it to length and dress the ends to fit the blade chucks. To sand heavy work, it's a good idea to back up the board with a strip of sheet metal that you have cut to the same size.
—R. J. De Cristoforo, Los Altos Hills, Calif.



5 Rules for Keeping Whitewalls White

By Walter E. Burton

ANYONE who owns whitewalls knows that they have to be kept that way. If the problem irks you, shouldn't you have bought black tires in the first place? But take heart:

Caring for whitewalls is slightly less troublesome on today's cars. When 14-inch tires were introduced, the makers reduced the width of the white band. This, they say, makes the smaller tires *look* even smaller. It also gives the owner less white area to keep clean.

Some time ago it occurred to me there might be tricks to the whitewall-cleaning job. So I set out to see the men who should know—engineers for the major tire makers. Here's what they told me:

1 CLEAN THEM OFTEN

Said one veteran tire technician: "Keep dirt from becoming deeply embedded, and in the long run you'll save both time and work."

2 LOOK IN THE KITCHEN FOR THE CLEANING MATERIALS YOU NEED

You can buy many good preparations for the cleaning job from car dealers and auto-supply stores. But chances are, you can also do an effective cleaning job with just what you'll find in your own kitchen.

Steel wool and soap or soap-impregnated scouring pads were recommended by several men. Dirt embedded by scraping a curb is most easily removed by scrubbing in the direction of the scrape; that is, parallel to the scratches or cuts in the rubber. The steel wool tends to tear apart when it is rubbed over raised lettering, and you may need several pads to do all the tires, but rinsing carries off the shreds of steel with the suds.

Powdered household cleansers also do a good job. Apply with a wet cloth or brush, scour as necessary, and then rinse. Abrasives such as powdered pumice have sometimes been used to remove really

stubborn spots. There is little chance that such abrasives will damage a tire, the tire men explained, since rubber tire compounds are made especially to withstand abrasion.

3 REMOVE THE CLEANER AS SOON AS IT HAS DONE ITS WORK

This rule could prevent damage if the cleaner is a type that might soften or otherwise affect rubber during prolonged contact. One technician cautioned that a strong alkali could soften the rubber and make it very difficult to clean.

Gasoline, household dry-cleaning fluids, and any other cleaner that has a solvent action on rubber should be used cautiously if at all. Prolonged contact should be avoided. Tire men expressed the view, however, that a cloth moistened with high-test gasoline or household cleaning fluid could safely be used to wipe off a spot of grease. This small amount of solvent would evaporate before it could do harm.

4 HOSE THE TIRE THOROUGHLY AFTER USING A CLEANER

Don't slight the rinsing step when you have used a water-soluble cleaner. Use a hose with good pressure. Be especially careful to wash out all cleaner and dirt from the recess formed where tire and rim meet. Otherwise, ugly streaks of dirt may mar the white band as soon as the wheel begins to turn.

5 REMOVE OIL, GREASE AND ROAD TAR AS PROMPTLY AS POSSIBLE

Not only do these spoil the looks of the tires, but they may damage or stain the rubber.

Scrape or wipe off all you can, apply a commercial or household cleaner in the recommended way, rinse, and dry. If a stain remains on the tire, there are two schools of thought among tire men about how you should proceed.

One group recommends wiping the stain with a cloth moistened in high-test gasoline or household cleaning fluid. Al-

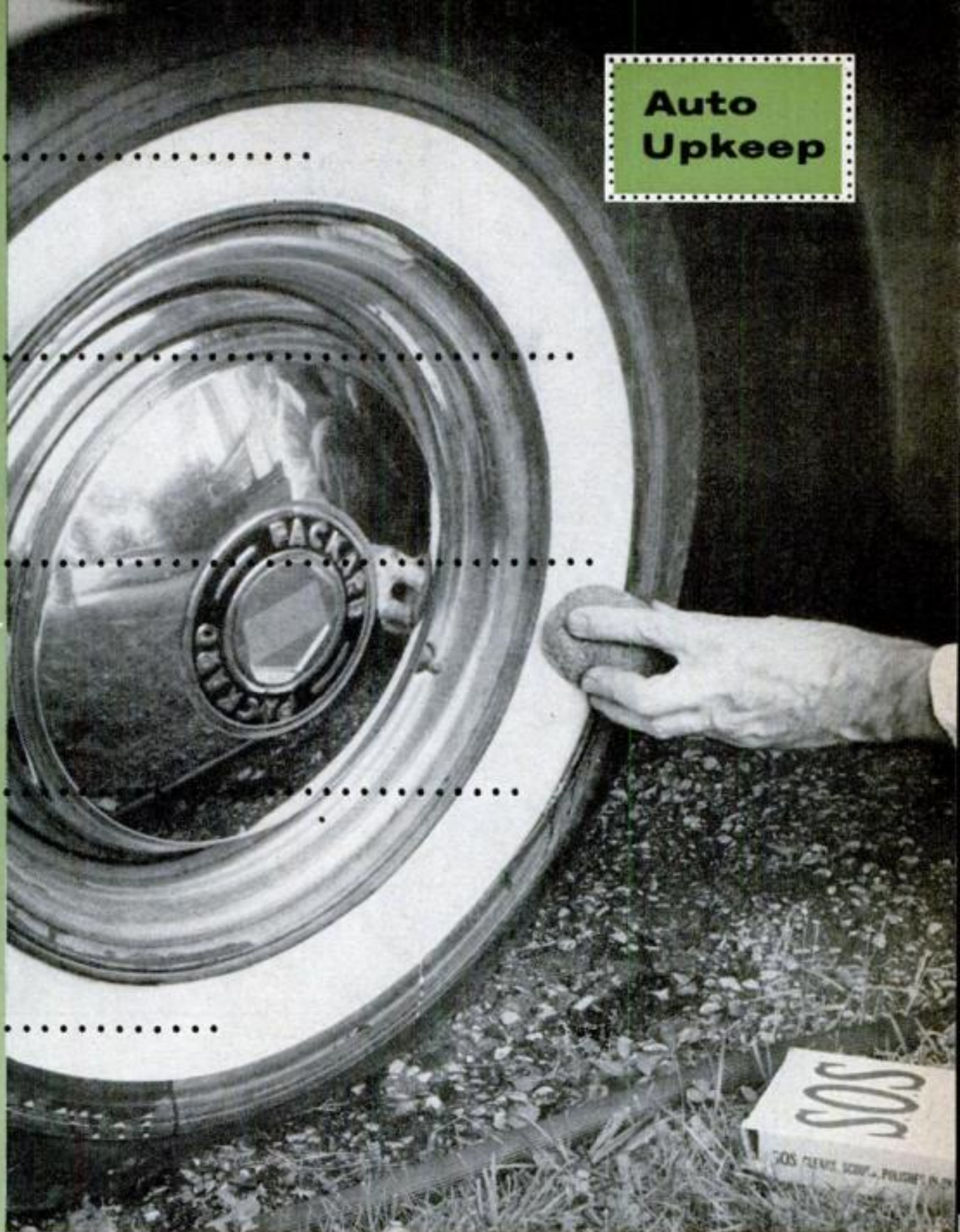
1 CLEAN THEM OFTEN

2 LOOK IN THE KITCHEN FOR THE CLEANING MATERIALS YOU NEED

3 REMOVE THE CLEANER AS SOON AS IT HAS DONE ITS WORK

4 HOSE THE TIRE THOROUGHLY AFTER USING A CLEANER

5 REMOVE OIL, GREASE AND ROAD TAR AS PROMPTLY AS POSSIBLE



low plenty of time for the solvent to evaporate, then use an abrasive cleaner again. If some stain still is in evidence, leave it alone for a few days. Elements that penetrated the rubber may then bleed out.

Another group looks with disfavor on the use of any rubber solvent. Instead, they suggest spreading pure lard or oleomargarine over the stain and leaving it until the staining materials have been softened. The dissolved sludge should then be wiped off, the area scrubbed with a grease-dissolving household cleanser and finally rinsed thoroughly with clean water.

Should you be tempted to try one of the commercial preparations now sold for de-tarring fenders, the best advice is—don't, unless you've first read the label and found that the preparation is spe-

cifically recommended for use on rubber. Technicians here are in agreement: A mineral oil or lubricating grease should never be used to soften tar on a tire.

But what if nothing works? What should you do if, despite everything, your tires have become hopelessly dirty or discolored—tires that started life as whitewalls but clearly aren't any more.

Then you have two final alternatives. You can clean the tires the best you can, and paint over the remaining dirt with one of the white rubber paints sold in auto-supply stores.

Or you can probably turn the whitewalls around so they'll be blackwalls. Makers foresaw the fix you might be in: The majority of today's whitewalls are reversible for just that reason.



"You need special spark plugs, too"

Always use the spark plugs specially designed for outboards—

CHAMPIONS!

You need a *special* trailer for boats. And you need special spark plugs for your outboard—Champions.

New Champion marine spark plugs are protected by a sealed, moistureproof pack. The gasket is secured so it can't be lost. And the exposed metal surfaces of this new Champion are guarded by rust-resistant plating.

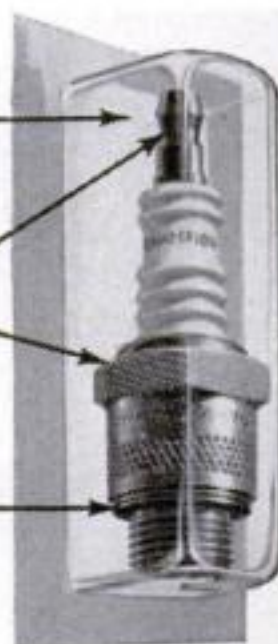
This new marine plug has Champion's special "J-gap" electrode design . . . needed for easy starts . . . smooth idle . . . and full power in outboard engines. This "J-gap" is one reason why *every major outboard manufacturer uses Champions as original equipment.*

Choose either the *new* marine Champions or the *regular* marine Champions. But always choose CHAMPIONS—the spark plugs specially designed for outboard motors.

Sealed,
moistureproof
package

Rust-resistant
plating

Secured gasket
you can't lose



CHAMPION SPARK PLUG COMPANY • TOLEDO 1, OHIO

Every major outboard manufacturer approves — and uses

CHAMPION

Spark Plugs

Happy day!

Your First Day in a New Car

It's a bright moment when you accept the keys of a new car. Behind you are the bargaining, the paper work, ahead a sequence of payments. Right now, a happy chore: learning the etiquette of living with your car. You're eager to get the feel, master any of the gimmicks—you expected some—then take your wife for the first ride. It's a moment to savor. Let's say the moment is now; the car above, yours. Agreed? Then turn the page and take the wheel . . .

PHOTOS BY W. W. MORRIS



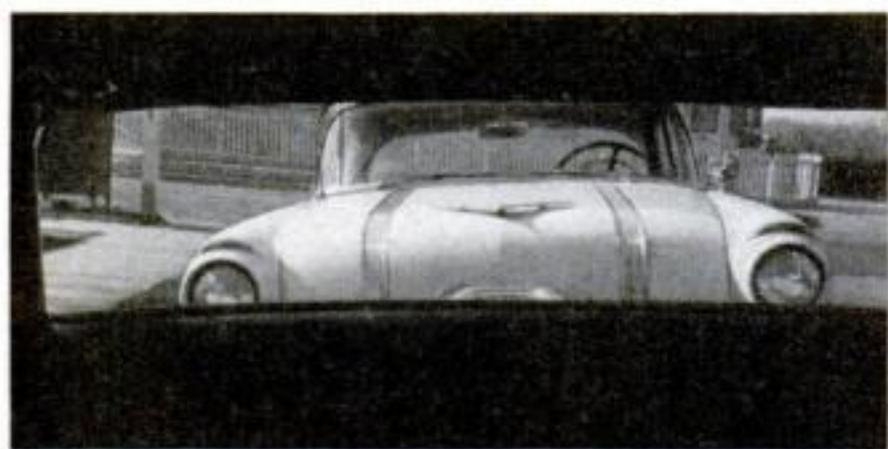
Use the owner's manual—it aims to put you in command. And try dash controls now so you'll know where they are without a fumble when there's company aboard



Check the clearances during your first



Park her just c'ose enough, slowly, without bumping the tires. Then sight over the hood ornament at the curb. Now you'll always park right



How does she back into parking space? Line up the hood ornament of the car behind you in the mirror





First Day in a New Car

Let your wife in on the fun. If you don't tell her, how's she going to know those red lights on the dash are supposed to go out when the engine starts?

ride. Pull up by a parked car. Then get out and see—were you too close or a mile wide?



First Day in a New Car



Explore under the hood, the owner's manual your guidebook. Get familiar with whereabouts of crankcase and auto-transmission dipsticks and the power-steering reservoir. While you're at it, be really professional—check their levels



Be sure you have what you've bought: Check off equipment on car invoice. The extras all there? Spare tire, jack?



Looks acrobatic maybe, but peer up under the dash for two reasons: Get a look at the fuse panel, record radio's serial number



A last idea, that first day: Put wood chocks on the garage floor as guides for getting all your new car in. Now you've earned it: Happy highwaying!

Gus Treats a Case

When the pretty schoolmarm's car wouldn't back up, Stan was sure he could fix it. It was lucky he had Gus to back him up

GUS WILSON slammed down the phone in the Model Garage. Why, that old coot Silas Barnstable, asking him to pull his old clunker out of the mud, then having the nerve to add: "And don't send that young whipper-snapper Stan Hicks!" Stan had turned into a darn good mechanic, even if it did seem like only yesterday that he was hardly old enough to shave.

Gus sighed at the passage of time and headed for the tow truck.

"Watch the store, Stan," he called back. "Have to give old Silas a tow."

A heavy overnight rain had left huge puddles everywhere this morning. Spring was in the air. . .

A horn blared in the doorway. Stan got up from his work abruptly and whacked his head on a car hood. Stunned, he motioned frantically to the driver of the 1957 Ford lunging down the center of the shop, and stepped aside just as the car dipped to a stop.

"Hey, lady! What are you trying to do, kill me? Drive it into a stall!"

A pretty young face framed with glistening black hair popped out the window. "No sir! I'm parking so I can drive out the back door if necessary!"

Before Stan could utter another word, the young lady stepped out of the car. We-e-ll, thought Stan, I'm glad Gus didn't send me to rescue Barnstable.

"Where's Mr. Wilson?"

"He's out on a call. I'm Stan Hicks, his assistant."

"Oh. . . I'm Mary Atkins. I teach kindergarten at the elementary school."

"You're a schoolteacher?" Stan blurted. "Why, you don't look old enough to—"

Her impudent little nose lifted. "Mr. Hicks," she snapped, her eyes flashing, "I came here to get my car repaired. I *can* go elsewhere!"

Stan smiled sheepishly. "Don't get riled up, Miss. I'm sorry. It's just that—well—doesn't seem like we had teachers like you when I was in school."

The fire left her eyes and she gave Stan a quick smile. "I'm sorry, too. And I'm sorry I made you bump your head. I was mad. You see, I just had a spring tune-up last week. Now the car won't go in reverse and the radio makes a funny noise. I tried to parallel-park in front of the department store

By Martin Bunn



of Spring Fever

"Stan's out for a few minutes, Miss Atkins," Gus said. "But he did mention a minor adjustment he forgot to make on your car."



downtown and the car wouldn't back up!"

Eager to prove to his pretty customer that Gus Wilson was not the only mechanic in the Model Garage, Stan quickly lifted the hood and examined the gear-shift linkage. It seemed okay. Then he recalled the tune-up she had mentioned. If the emergency-brake cable had been adjusted too tightly, the car might move ahead freely, yet hesitate to back up because rear-wheel brake shoes have a tendency to self-energize if maladjusted.

Sliding a jack under the axle, Stan slid under, checked the emergency-cable tension and then slowly rotated the rear wheels. "The wheels turn backward."

"Well, perhaps the wheels move, but the gearshift lever won't go into reverse!"

Stan slipped into the seat and tried the shift lever. With the clutch depressed, it slipped into reverse easily.

"But it wouldn't work for me!" the girl insisted.

Stan reached for the ignition switch. "Let's drive it back and forth and see." As he turned the switch, a loud "clack" came from the vicinity of the radio.

A shapely arm flashed past Stan's nose and an accusing finger pointed at the radio. "There, that's what I meant was wrong with the radio!"

"It doesn't sound like the radio, Mary—er—Miss Atkins."

TURNING the switch off and on, he added, "Sounds like a relay to me." Glancing across the dash, his eyes spotted the overdrive-lockout control. "Sure." He grinned. "The overdrive relay. It's mounted in the engine compartment right in front of the radio. It could sound like the radio to anybody who didn't know."

"But what about the reverse?"

"You have a ground between the relay and the overdrive governor switch," Stan announced, reaching for a creeper. "That's why your car won't back up."

He slid beneath the car and checked the wire leading to the tiny governor projecting from the overdrive housing. The wire looked sound. Remembering Gus's counsel about faulty switches, he removed the wire and rubber boot covering the switch.

From above trim ankles came a plaintive voice: "But what have this 'ground' and 'governor' got to do with the reverse gear?"

"Just wait—I'm going to tell you."

Stan slid out, governor switch in hand. "This little gadget should be the trouble-maker," he said, inverting the switch and clamping it in the vise. Removing the screws from the cap, he explained that the unit is a centrifugal switch.

"See, here's the trouble." Stan pointed to a tiny drop of dirty water on the switch points inside the cap. "You had continuity across the points all the time because of this drop of condensation." He wiped the cap dry, polished the points, and replaced the cap.

"Is that all that's wrong?" she asked.

"Probably. You see, the condensation made the relay energize every time the ignition switch was turned. Then *that* energized the overdrive solenoid. The solenoid kept the lockout rail from letting the low-reverse sliding gear engage with the reverse idler. Understand?"

"Good heavens, no!"

Stan chuckled. "Okay—let's try this. With overdrive, when you reach about 28 miles an hour, centrifugal force shoves the flyweight segments in the governor switch-out to close the switch points. When the governor switch closes, the car can go into overdrive. At the same time, the transmission is locked in such a way that you can't shift into reverse when in overdrive. Your switch was closed all the time, so you couldn't possibly shift to reverse. That better?"

"A little," she answered uncertainly. "My, you certainly know a lot about cars."

It was a while before Miss Atkins left the shop. In fact, she'd barely departed when Gus Wilson returned.

"That old tightwad," Gus said as he stepped from the tow truck. "Bald tires, no chains. Any business while I was away?" He lit his pipe and walked over to the shop order pad.

"Not much," Stan replied from under the hood of a car. "Just an old school-marm, a Miss Atkins or something. Car wouldn't back up. Overdrive. Took off the governor switch, put it in the vise, found a bead of condensation across the switch points. I cleaned the points and put it back on."

After a long thoughtful silence, Gus said, "I'll bet Miss Atkins comes back inside half an hour."

"You're pulling my leg, Gus. Bottle of

* Best reasons in the world
for MORE LIGHT...AIMED RIGHT!



"AIM TO LIVE" has an especially deep significance to the family man. He seeks every protection for himself and them. And one of the simplest for him to provide is the extra margin of night driving safety available through new Guide T-3 Headlamps.

These new Guides are the latest industry-approved sealed-beam type, with stepped-up power and the new light pattern which gives you more light on the right—where you need it most. They can be aimed without even turning them on because Guide precision-grinds three "Guide Points" on the face of each lens so that the aiming plane is accurate to within one ten-thousandth of an inch. Such precision, plus the simplicity and speed of aiming the T-3 way, means MORE LIGHT—AIMED RIGHT! That means extra safety for your family.

If your present headlamps are more than two years old have them replaced now with new Guide T-3s. And make it a practice to have your headlights aimed at least twice a year.

AC SPARK PLUG  THE ELECTRONICS DIVISION OF GENERAL MOTORS

Guide

T-3

**SAFETY-AIM
HEADLAMPS**

*Buy in pairs
where you see*

AC

Watch Walt Disney Studios' ZORRO
every week on ABC-TV

APRIL 1958 203

soda says she won't come back. Okay?"

"That's a bet, Stan. Thirty minutes."

"Right," Stan agreed. "Say, Gus, I've got an errand at the drug store. Okay if I take off for a few minutes?"

GUS, bent intently over a running engine, didn't hear the Ford come in, or see a pretty, dark-haired girl get out.

"Stan! Stan!"

Gus turned.

"Oh," she said breathlessly, "You're Mr. Wilson."

with her tomorrow you can tell her—"

"Ball game with her? How'd you—"

"Well, first off, I knew she wasn't an 'old schoolmarm.' Remember, I'm on the school board. In the second place, Stan, you don't usually write down the phone number, the landlady's name, and the color of the customer's hair and eyes on the shop order. Or circle the phrase 'two o'clock, Randall Field,'—which, in case you didn't know, is the time and place of the opening game for the high-school baseball team tomorrow. And lastly, if that

package you brought from the drug store isn't candy, I'll eat it."

Stan smiled weakly.

"Gus, you've got me. How'd I lose the bet?"

"You mentioned condensation. That was the tipoff. The switches hardly ever collect condensation, but once in awhile they get water inside when driven through hubcap-high water. Like today—"

"On this model Ford, the governor switch points almost downward. You said you put it in the vise to take the cap off—upward, I fig-

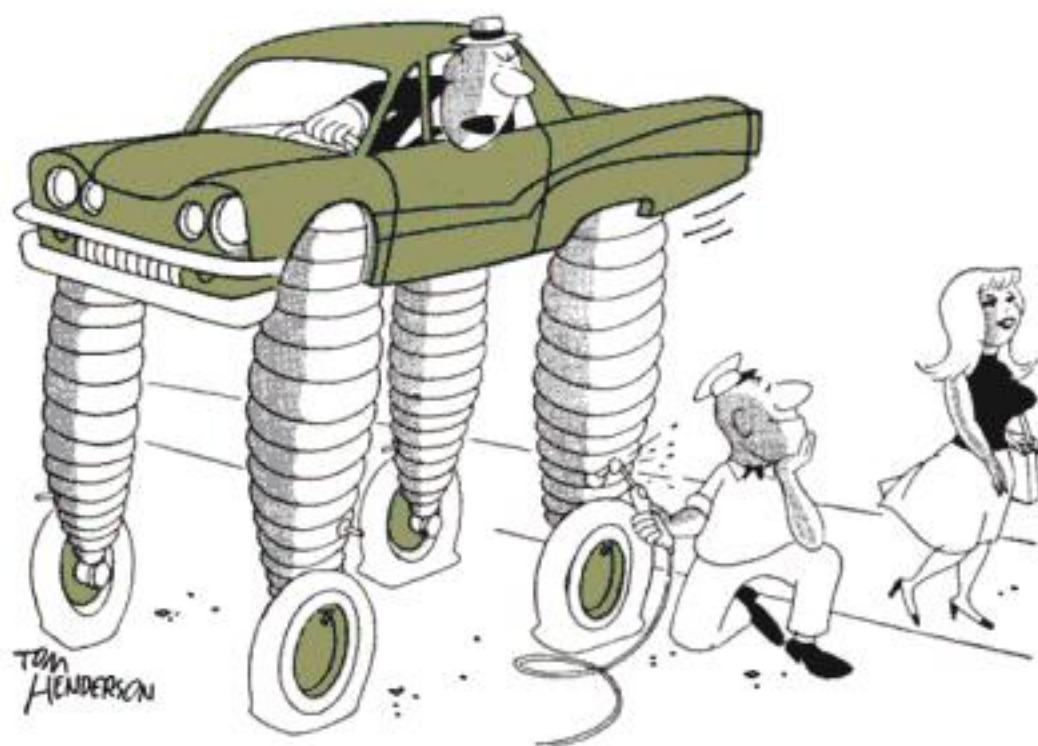
ured—and just cleaned the points. So I guessed, since you couldn't see inside the governor because of the circular flyweights on this model, that there might be more water inside.

"Now a slight knowledge of the workings of the female mind told me Miss Atkins would return to the store, because today is Bargain Day. Any bump on the way might shake down the water, shorting the switch again.

"You tell her tomorrow, when you buy her a soda at the game, that the way to get liquid out of a container is to tip it upside down. Which is just what I did. I blew the water out of the governor, right on the car."

Gus chuckled, then added, "Here's a couple of tickets for the game. Red Plummer gave them to me."

Stan handed one ticket back: "Thanks, Gus, but you go, too. I'm doing a little thinking today—teachers go free." **END**
Next Month: Gus meets a master fixer.



"I said fill the tires, not the air suspension!"

"And you're Mary Atkins."

"Stan—uh—Mr. Hicks repaired my car. Now it won't back up—again!"

"I see," Gus said. His eyes twinkled. "Stan's out for a few minutes, Miss Atkins. But he did mention a minor adjustment he forgot to make on your car."

REACHING for the air hose, he slid under the car, then reappeared. He smiled. "There—everything is fine now."

Miss Atkins was just driving off when Stan came sauntering across the street. Spotting the familiar car, he broke step and dashed toward Gus.

"Guess the sodas are on you, Stan," Gus announced.

"Was she in here?" Stan demanded.

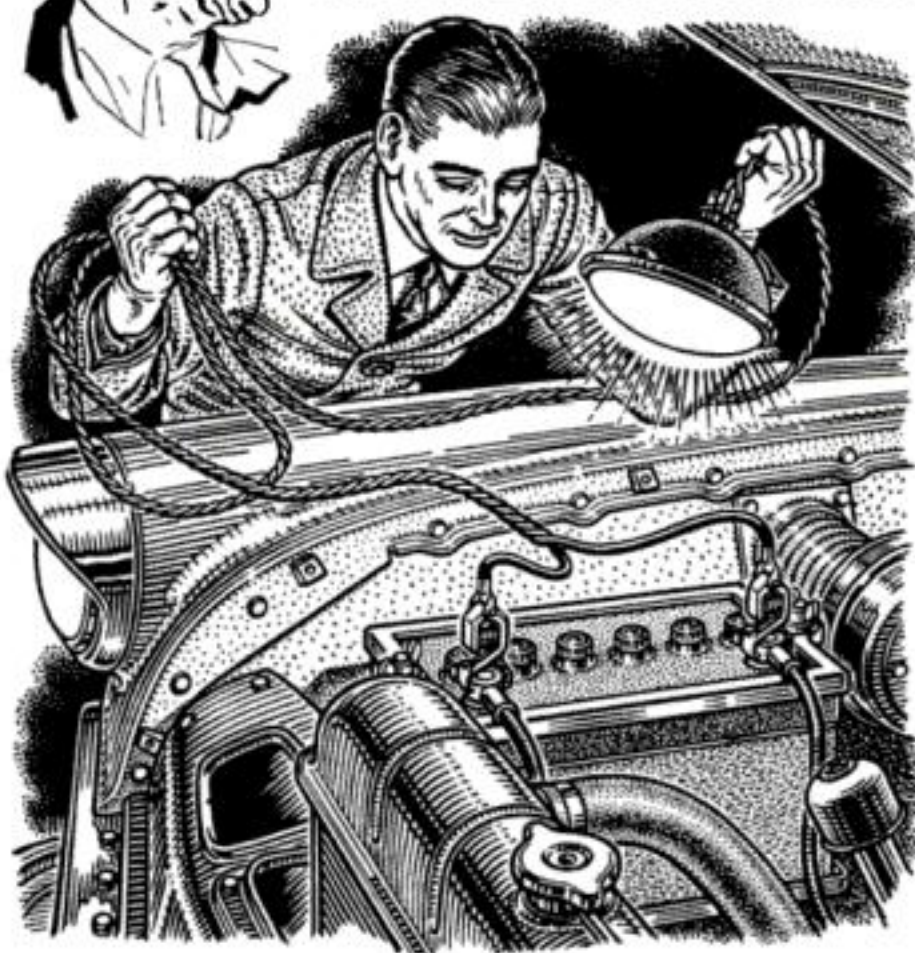
"Yep, and I fixed her car."

"Okay," Stan groaned. He walked to the vending machine and came back with two bottles. "Tell me what I did wrong."

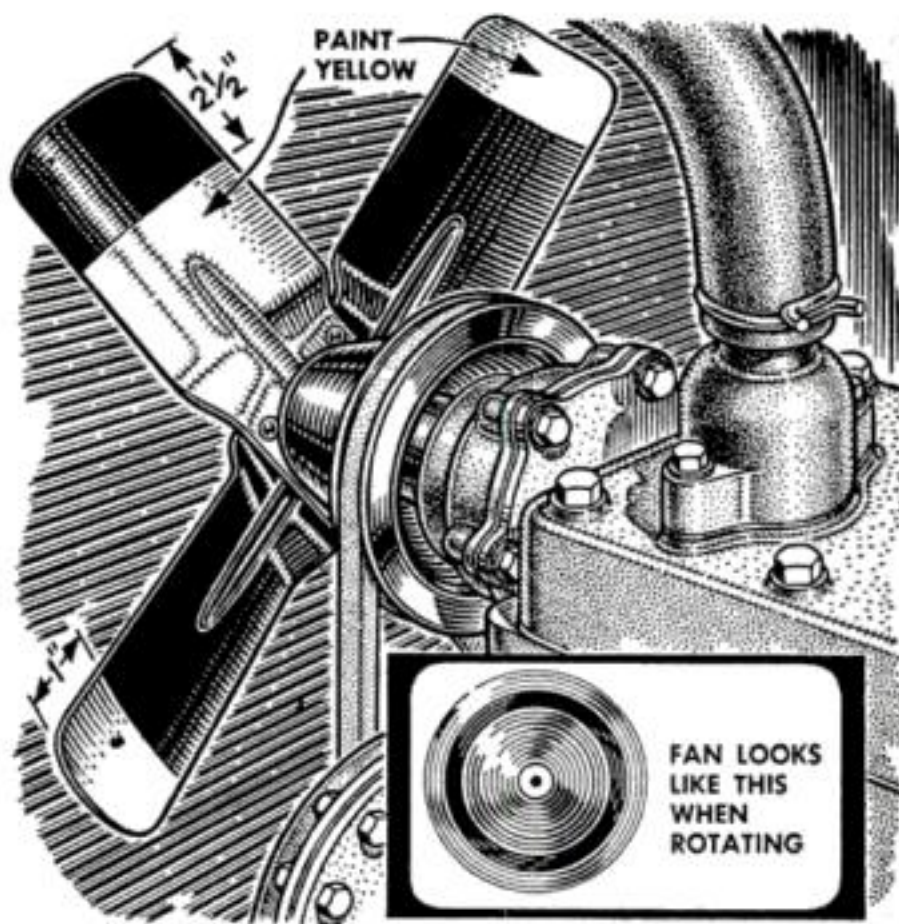
"Well," Gus began, sipping his free drink, "when you're at the ball game



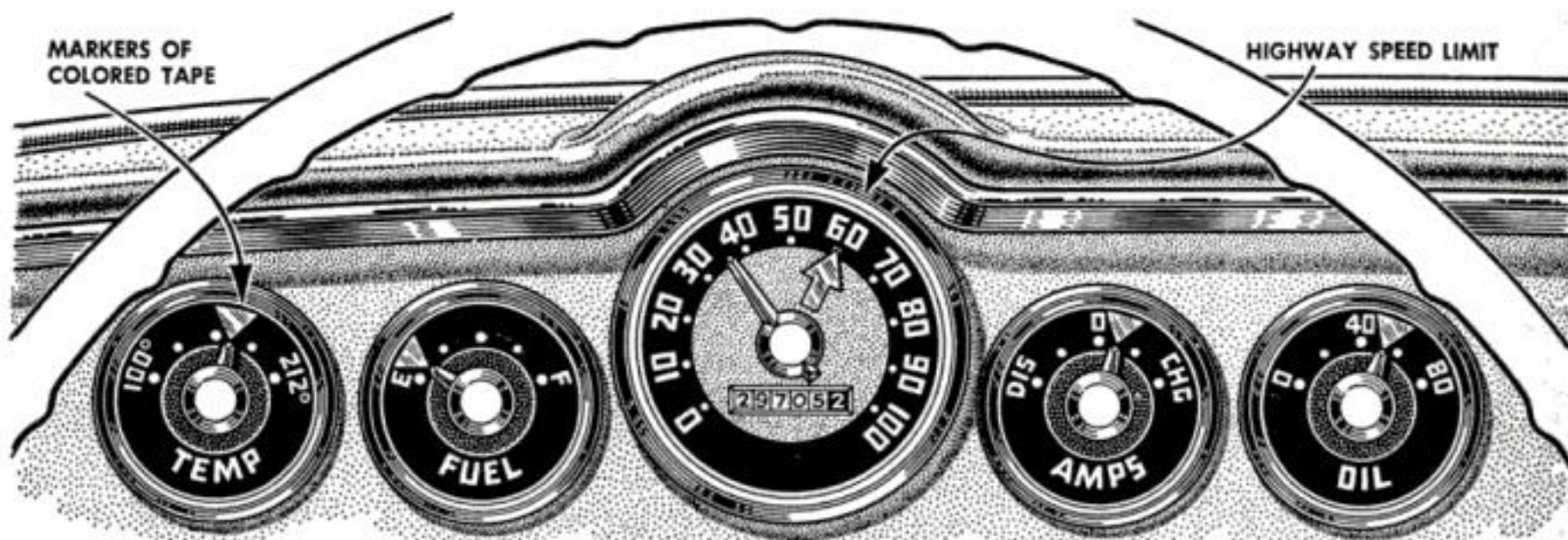
Hints from the Model Garage



Make a trouble lamp that *really* illuminates the work area. Use an old two-beam headlight in which one filament has burned out. Solder wires about 12 feet long to the good terminals of the bulb and attach battery clips to the wire ends.



A rotating fan will show up clearly as a yellow disk with a black ring when *part* of each blade is painted yellow for safety, as shown above. To avoid splashing, use a fast-drying paint and let it dry thoroughly before starting the engine.



TEMPERATURE GAUGE. Place marker on glass in line with needle after stabilizing engine's temperature by driving the car for at least half an hour.

FUEL GAUGE. Run engine until fuel in tank is exhausted. Then pour in three gallons and mark position of needle so you'll know your gallon reserve.

AMMETER. Run engine until needle drops down to normal charging rate. Then, with lights and all accessories off, mark its position at fast idle.

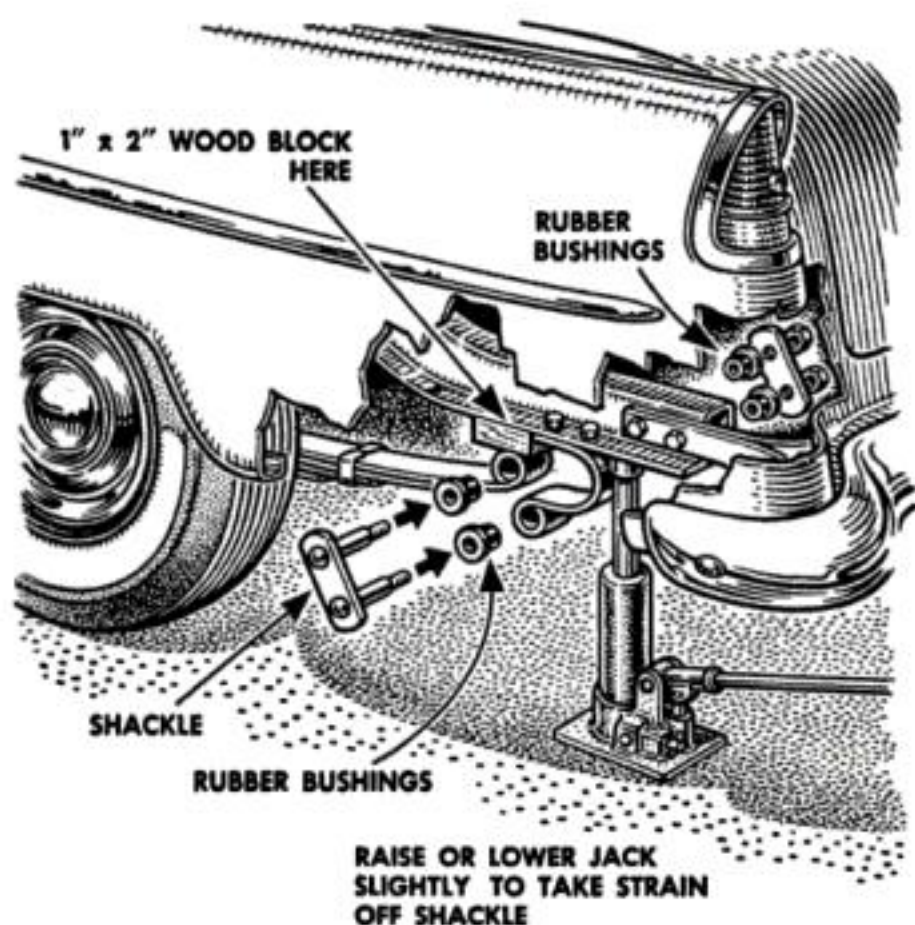
OIL-PRESSURE GAUGE. Mark needle's position while running engine at speed equal to about 30 m.p.h. Be sure that the engine is thoroughly warm.

You can keep tabs on your car's performance and note gradual deterioration by marking the critical readings on the dash instruments with small arrow heads cut from colored gummed tape. The arrows will also serve as an operating guide

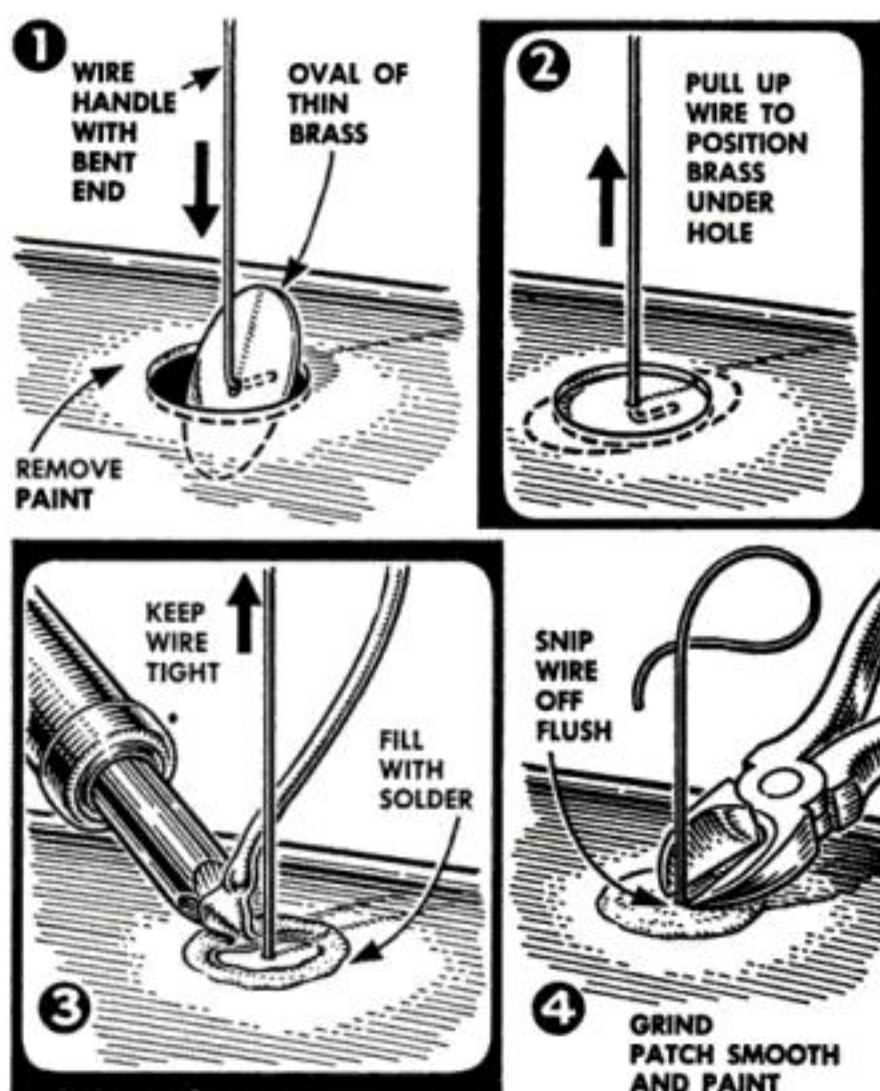
to other persons driving your car. Place an arrow opposite the speed limit for your state to keep you from unconsciously exceeding it, and stick one on the fuel gauge to indicate the actual amount of gas remaining as the needle nears "E."

Please turn the page for more hints

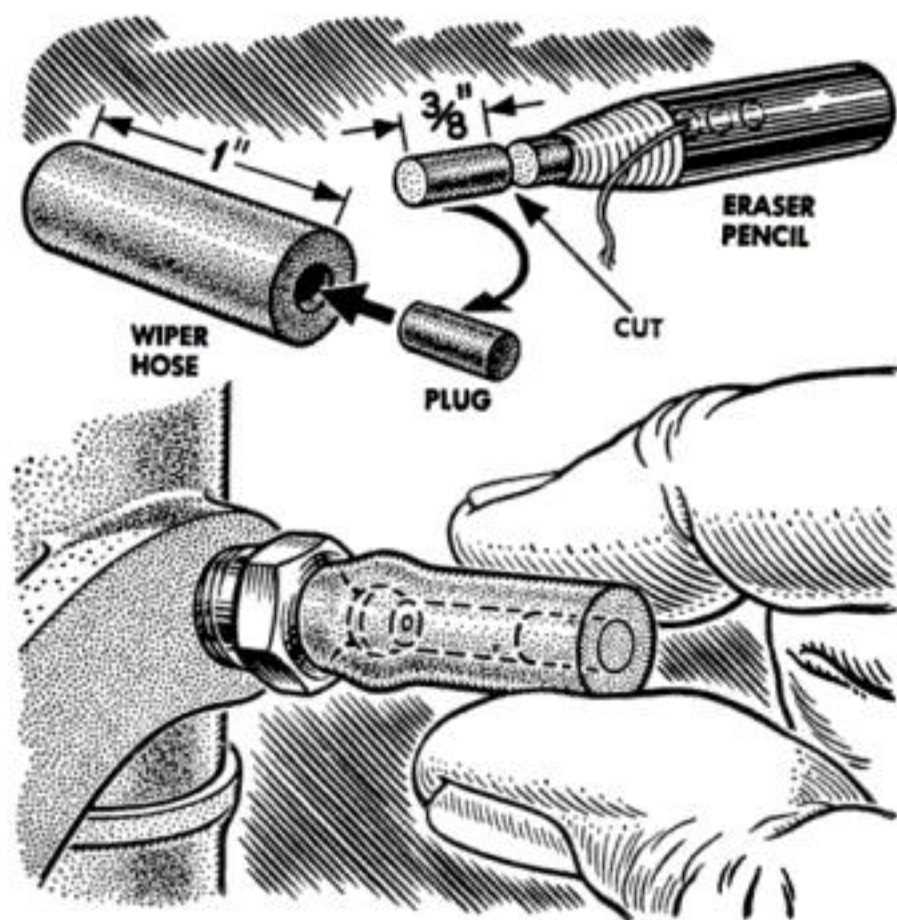
More Hints from the Model Garage



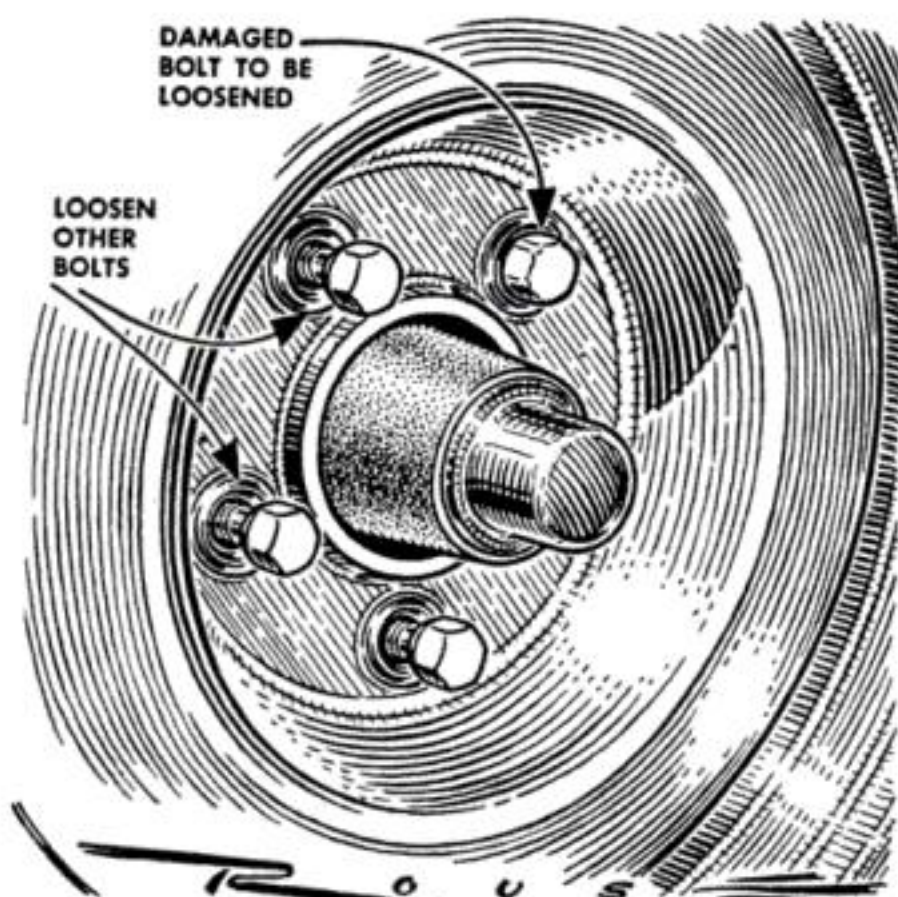
Worn spring bushings can be replaced without effort. Jack up the chassis until there is room for a block of wood between the spring and hanger eyes. Then lower the chassis. With tension off the spring, the shackle can be removed easily.



To fill a screw hole after removing an accessory, back it up with an oval of brass held in place with a wire. Flow solder over it to build up the surface and snip off the wire when the solder sets. Grind the patch flush and paint to match.



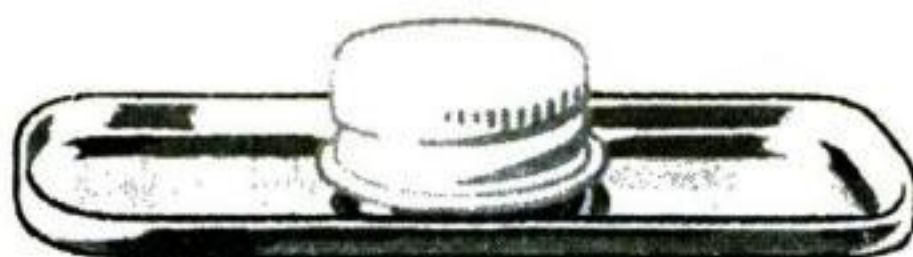
Protective caps, quickly made from windshield-wiper hose, will keep grease fittings clean and make them easy to find. Cut the hose into 1" pieces and close one end with plugs cut from an eraser stick. Clean the fittings *before* you cap them.



When a wrench won't grip the head of a damaged wheel lug, you can sometimes jar it loose. With the car jacked up, loosen the other lugs. Then lower the car and rock it back and forth to make the wheel shift slightly, causing the lug to turn.

SIMONIZ MAKES IT

A TERRIFIC NEW CAR POLISH!



**NEW
LIQUID
BODY
SHEEN
by SIMONIZ**

**CLEANS & POLISHES CARS
without a wash job**

**New
HIGH-DRY SHINE
for cars**


New BODYSHEEN gives car a HIGH shine, brighter than any paste wax. Thick-liquid cleaning and polishing agents leave the car dazzling.

New BODYSHEEN gives car a DRY shine. It takes off normal dirt, dust, road grime . . . there's no need to wash your car first.

New BODYSHEEN gives your car like-new sparkle and color. Restores original lustre to the finish. Makes faded colors glow like new. Bodysheen is ideal for all the newest car colors and finishes, too.

DIRECTIONS: Shake can well. Pour small amount of Bodysheen on cloth and wipe well on car. Let dry to a haze. Wipe off with soft cloth.

NOW — \$1.49



For clean oil all the time
call for

 **HASTINGS**

Only Hastings Oil Filter Cartridges keep oil clean *all the time*, because only Hastings has Densite filtering material.

Densite is different! Millions of selected cotton fibres—pressure packed—trap even the most microscopic dirt particles. Only Densite keeps oil clean from filter change to filter change, when replaced as normally recommended.*

Next filter change, call for Hastings—for clean oil *all the time*! Hastings Manufacturing Co., Hastings, Mich. Also makers of Piston Rings, Casite, Wear Reducer, Spark Plugs.

**Proved by tests conducted in accordance with U.S. Bureau of Standards procedures.*



U. S. Patent
No. 2,797,811



BEFORE AND AFTER: Hi-fi pours from set at right, although it doesn't look much different from its old self (above). Only changes that show in front: a grille-cloth-covered port for speaker enclosure, at lower left, and new pre-amp, sitting on upper shelf.



**Hi-Fi
and
Electronics**

I Built Hi-Fi into My Old Phonograph

By Everett H. Ortner

WITH simple carpentry, a few tools, some good advice, and plenty of trial and error, I'm getting music now from my old phonograph that its makers never built into it.

My radio-phonograph, five years ago, was the Cadillac of its day. It set me back 400 simoleons, and tone wasn't the primary reason we chose it. We got it because my wife liked the French Provincial cabinet. The set was sweet-toned and pleasant, but you knew you were listening to a record player. Carnegie Hall never moved into my living room—a fact that became increasingly apparent as each of my friends got real, certified hi-fi sets

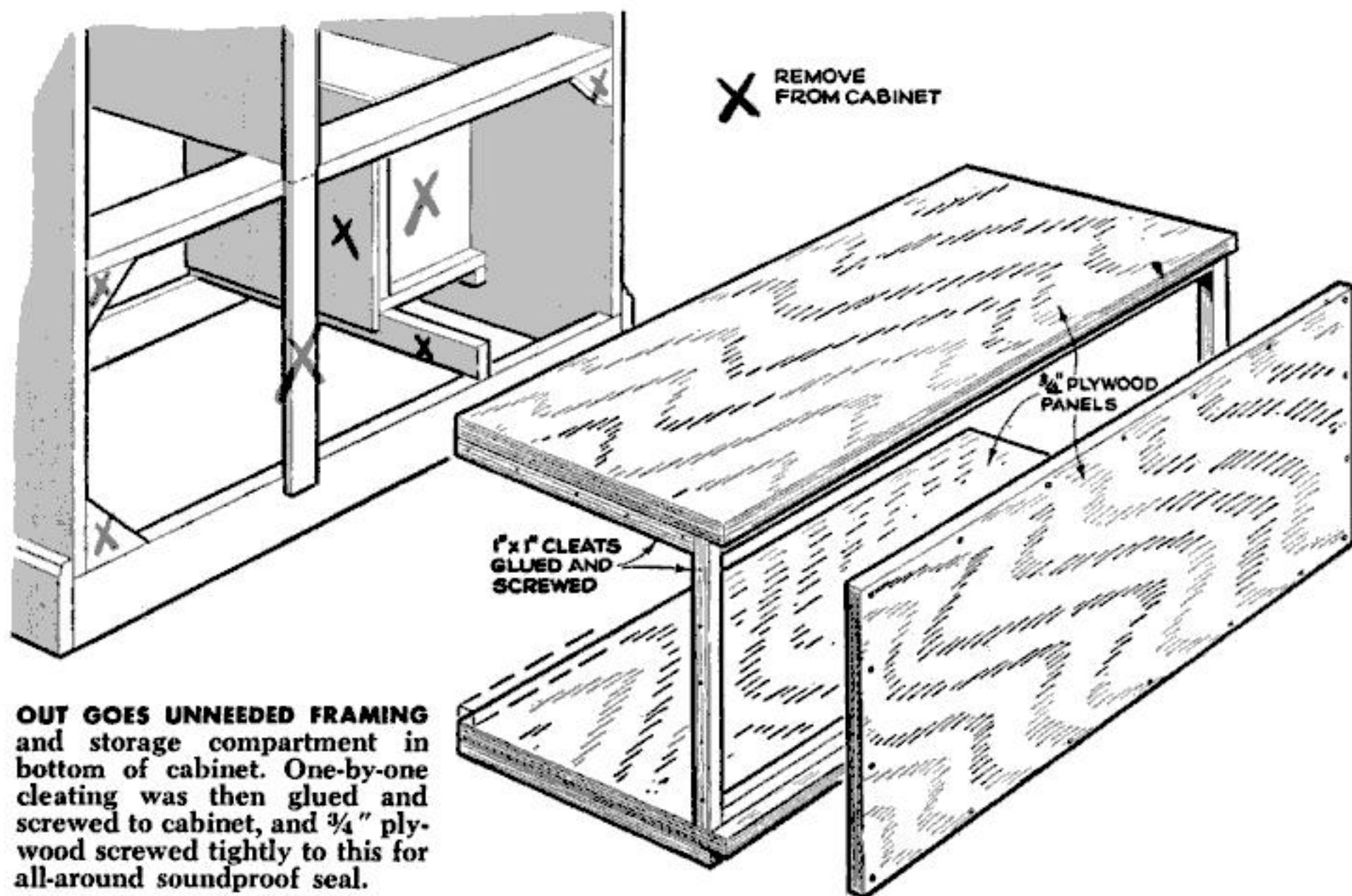
(and Carnegie Hall) in *their* living rooms. They discussed decibels and cycles, while I, a hi-fi have-not, listened sadly.

I started my campaign of improvement by getting a friend—a hi-fi expert—to help me plan a two-part program. The first phase required little money but plenty of non-expert elbow grease: (1) replace all tubes, (2) enclose speaker compartment, (3) install a better pickup, (4) level the record changer, (5) experiment with set location.

The second phase required scraping up the cash for: a turntable and tone arm, magnetic pickup with pre-amp, tweeter and crossover network.

Tube replacement worked unexpected

Bass-reflex enclosure needs only elementary carpentry



OUT GOES UNNEEDED FRAMING and storage compartment in bottom of cabinet. One-by-one cleating was then glued and screwed to cabinet, and $\frac{3}{4}$ " plywood screwed tightly to this for all-around soundproof seal.

wonders. I hadn't realized how much sparkle had disappeared from the old set with tube aging. Now a tinkly clarity came back—along with a pleasant bonus: An irritating on-off buzz that I had vaguely blamed on our kitchen fluorescent lamps disappeared.

Enclosing my speakers was the second step and, encouraged, I plunged into it.

Like most sets made before hi-fi swept the nation, my speaker compartment was open—top, back and bottom. This arrangement helps the manufacturer's profit statement, but not the sound. With the same speakers in a bass-reflex enclosure, my hi-fi expert told me, I could get a better low bass, while ridding the middle bass of its hollow boom.

This took work and—for this uncertain craftsman—courage. I started by sawing out anything inside my cabinet that I could do without. I wanted the biggest cavern I could get.

To insure that the $\frac{3}{4}$ " plywood panels—floor, top and back—made solid, airtight contact all around, I cleated them in with one-by-one stock, using plenty of screws.

In front, where my speakers were set

in a hardboard panel, futile to screw into, I contented myself with gluing the hardboard side of the cleat.

The critical part of a bass-reflex enclosure is the port. This is nothing more than a hole, of area determined by the volume of your enclosure.

I used the chart accompanying this article to figure the area of my port. This is a rough—but good—estimation. For finer tuning of your port, you'll need a way of changing its size. This can be done either by fitting it with a sliding door so that you can open it or close it down at will, or by making it smaller than the chart shows and then drilling holes around it to enlarge the area. A couple of friends who are out of work are handy here—they sit around and listen to a test signal, such as that provided by Popular Science Test Record No. 1 (PS, Jan. and March '57), while you increase or decrease the port size. Don't despair if you drill too many holes; wood putty will plug them up.

Finishing the enclosure is simple. Ozite—that's the feltlike stuff carpeting is laid on—is stapled or tacked in loose folds around the inside of the compart-



ESTIMATED AREA OF PORT for enclosure was computed by means of chart at right. Extra speakers do not affect estimate. Simplest way to tune port: Cut it slightly smaller than esti-

ment; and grille cloth is stretched over the port.

A new cartridge was next on my list, but here I ran into a snag. I discovered that my record changer is one of the few with a non-standard mounting for the pickup cartridge. Unless I bought a completely new record changer, I was stuck with my old pickup.

At this point a brief session with my

BASS-REFLEX PORT AREA

CABINET VOLUME (CU. FT.)	PORT AREA (SQ. IN.)			
	8" SPEAKER	10" SPEAKER	12" SPEAKER	15" SPEAKER
2	16	12	8	—
3	32	24	16	—
4	60	45	32	—
5	90	65	50	25
6	—	90	70	36

ated size, then enlarge by drilling holes, checking sound with a record. Grille cloth, to cover port, can be wrapped around the panel and tacked in back, or glued or tacked in front.

wife, hi-fi consultant and checkbook produced an alternate scheme. I gave up my dream plan for a semi-professional turntable and tone arm and settled for the present pleasure of a new top-quality changer with a magnetic pickup.

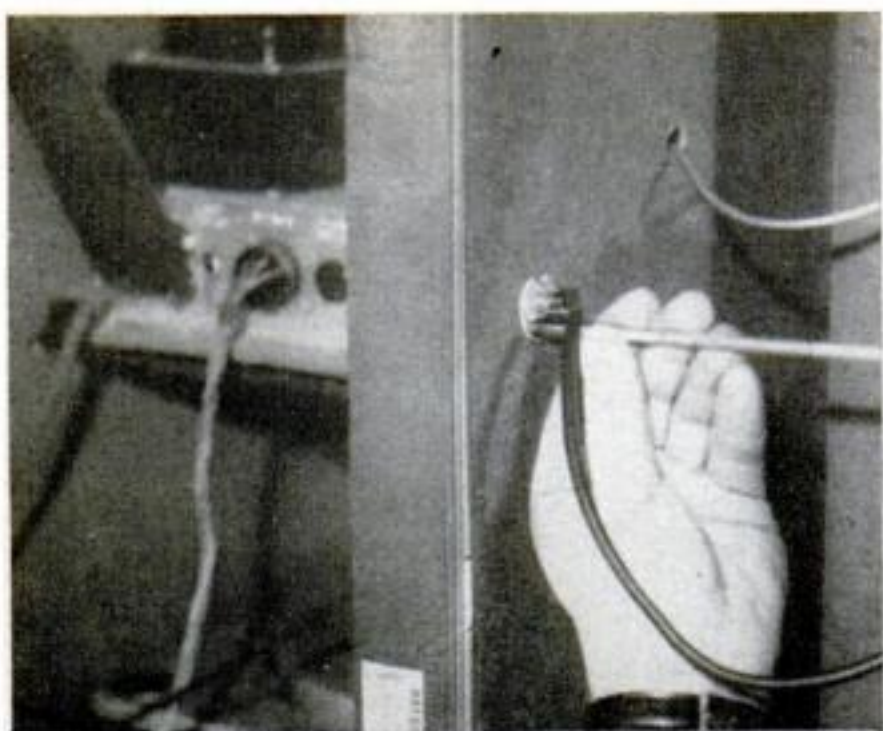
A word here about pickup cartridges, gleaned from talks with my hi-fi friend: Modern ceramic and crystal pickups, he told me, will give a wonderful boost to



INSTALLING NEW CHANGER: After old changer has been lifted out of drawer frame, new changer is set in and new positions marked for metal angle brackets, which hold support



springs. Frame was trimmed wherever changer touched. Band permits changer to be lifted without damage during fitting and leveling—latter done by inserting extra washers over springs.



CONNECTION TO PRE-AMP is made through jack, shown being attached. Cord from changer plugs in here. Other wire goes from pre-amp to amplifier. Now, pulling two plugs frees pre-amp.

tone quality even in old sets. They replace the old cartridge and require no alterations or additions.

But if you've got extra money jingling in your pocket and an unwillingness to settle for anything short of real hi-fi, you have another choice: a magnetic pickup. The only drawback here is that you need a pre-amp with it. The magnetic cartridge is beautifully sensitive—but weak. A pre-amp is necessary to amplify the signal before it gets to the amplifier.

One-tube pre-amps, which work off house current, are available, but they have a serious fault: hum and noise. On advice of counsel I ducked the problems usually associated with pre-amps by using the transistor job described at the end of this article. It is specifically designed to match the new General Electric VR II cartridge I had chosen.

Installation of a record changer involves a host of little problems. All I can tell you, to cheer you up, is that none of them are technical and that all can be solved by measuring, cutting and fitting.

Three points should be kept in mind: (1) the turntable must be level in the playing position, (2) the changer must float freely on the mounting springs, (3) the mechanism underneath the changer deck must clear all obstructions.

First I had to relocate the drawer brackets on which the mounting springs rest to match the position on the new

changer. Now with the new changer sitting on springs in the drawer, I marked those places where the changer touched inside. I notched and cut away these portions of the drawer until the changer floated freely.

I found it was a good idea to study the effect that the controls had on the changer. A little arm, for example, poked out and snubbed the drawer side when I set my changer speed at 78 r.p.m. I had to cut a slot for sliding room.

Fitting and leveling my changer were made easier for me because the manufacturer, Collaro, had thoughtfully provided a harness so I could lift it with one hand. The leveling, a finicky business, was done by inserting rubber washers between the springs and deck.

Electrical connections were easy. I saved the connecting wires from my old changer because they had plugs that fit the sockets on my amplifier. The shielded wire that had connected the old pickup to the amplifier now goes from the pre-amp to the same socket it used to. The shielded lead on the new changer plugs into the standard socket on the pre-amp. The AC wires that powered the old motor now feed the new one.

With the alterations in the set completed, I enlisted the aid of a muscular friend for the final problem.

Experimenting with location in the room, I used the PS Test Record No.2, "True Sounds of Musical Tones," to give me a broad selection of musical sounds. We tried a half-dozen different spots. The best one turned out to be catty-cornered at one end of the room. Here the growl of the double-bass viol and the chesty tones of the tuba were a delight.

Unfortunately, this location didn't last long. My wife, with that unreasoning conservatism that women often have, objected. We compromised with the set in second-best position—flat against the narrow wall.

But she is delighted with the new sound in our living room, and I think there is going to be a peace offering. I overheard snatches of telephone conversation the other day that included words like "cross-over" and "tweeter." My birthday isn't far off. END

NEXT MONTH: Baffled by hi-fi jargon? In May PS, a dictionary of hi-fi terms will take the mystery out of these new words.

Transistor Pre-Amp Works Without Hum

THIS simple transistor pre-amp gives top-quality performance with a low-output magnetic pickup. Its power requirements are so low that it can operate for at least a year on its built-in batteries. Since no AC power is used, it is hum-free. Transistors are inherently free of other noises, such as microphonics, that plague tube-type pre-amps. So now you can avoid all the usual problems of adding a high-quality pickup to your hi-fi system.

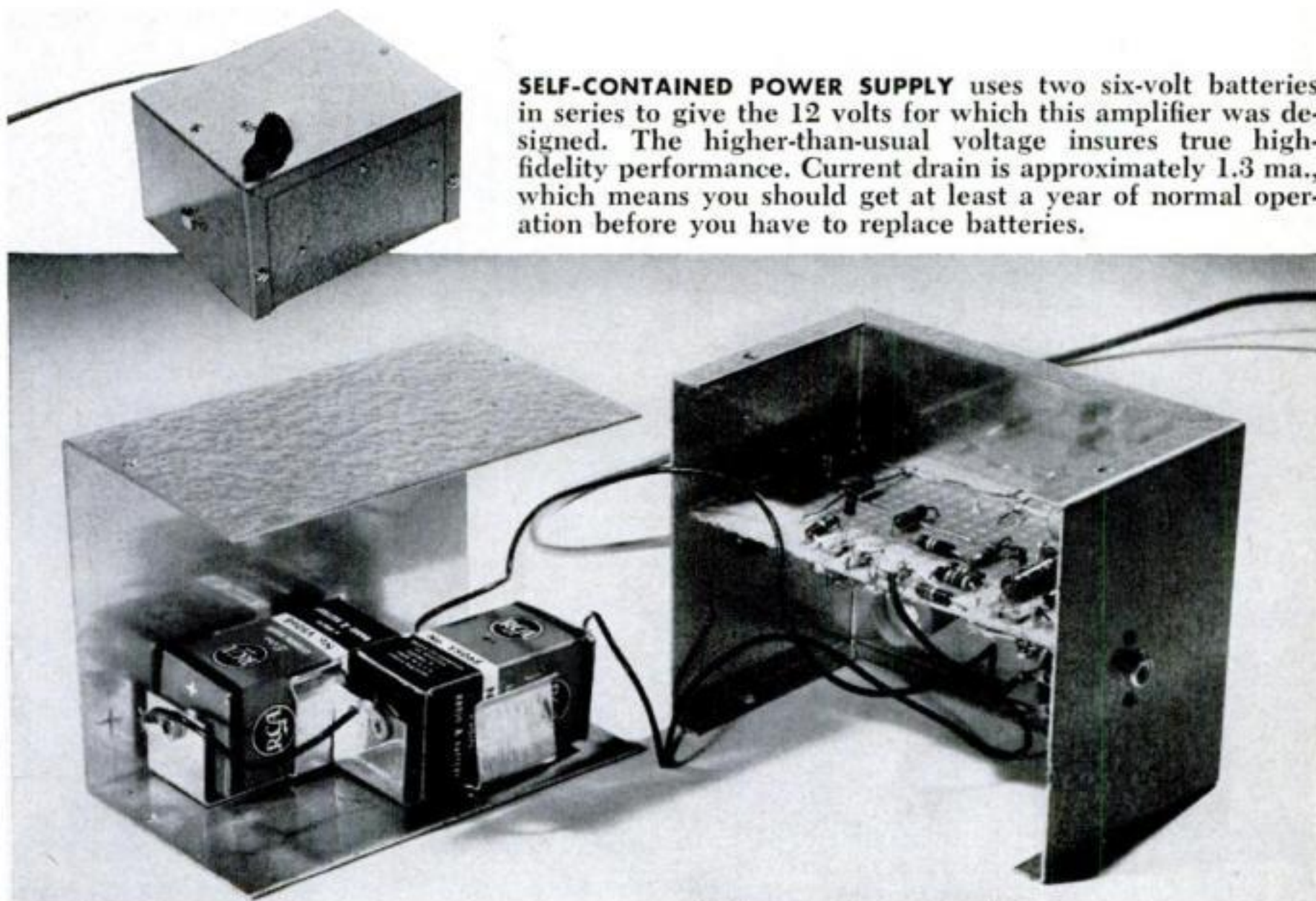
The unit is specifically designed to work with the new General Electric VR11 pickup cartridge. It will work equally well with other cartridges if you follow the manufacturer's recommendation for the value of the pickup-load resistor, R1. Record equalization follows the RIAA curve used on practically all modern long-playing records.

Construction is easy, even for a begin-

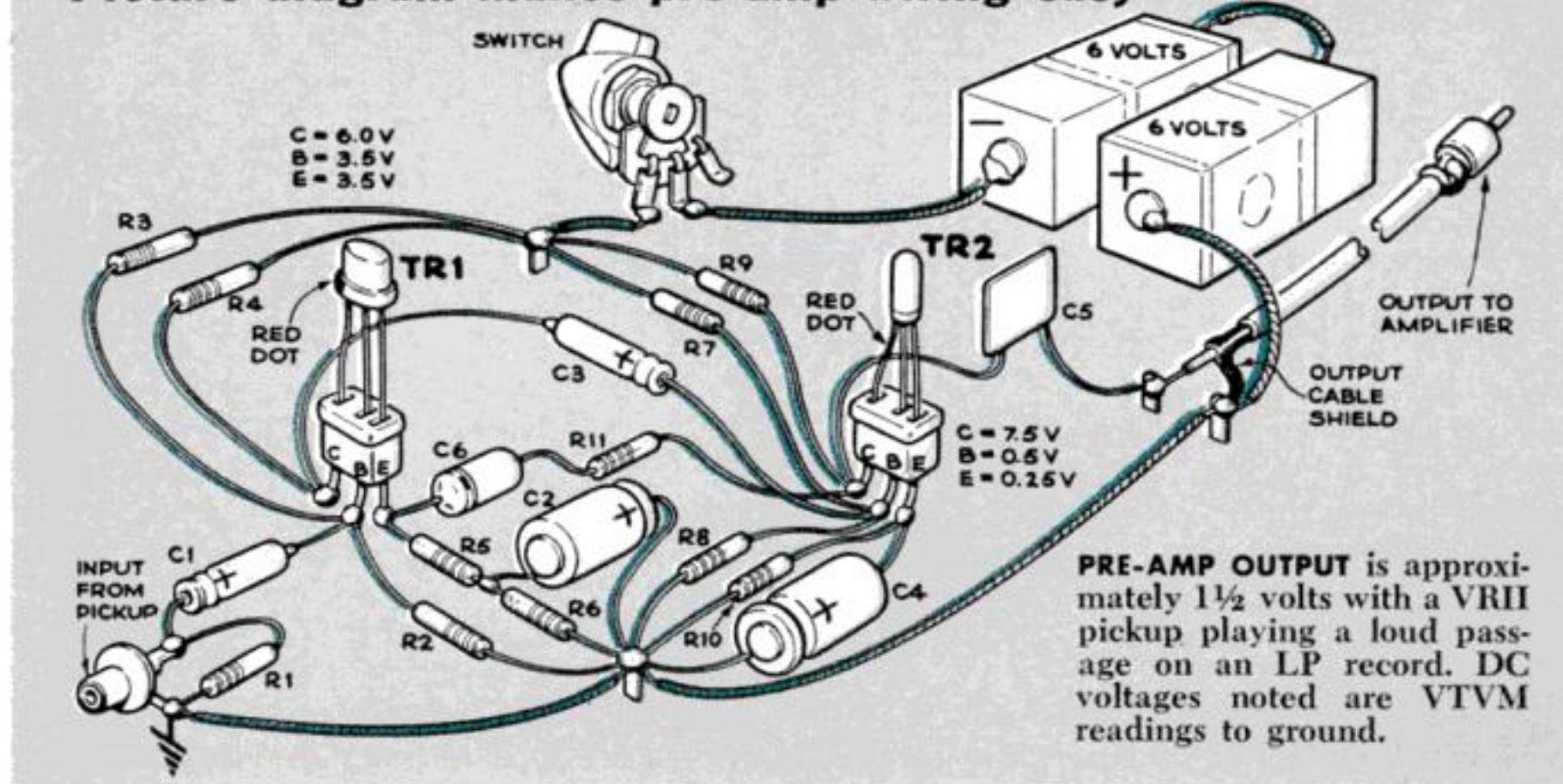
ner. Almost any layout of parts will do, as long as you avoid bringing the output and input circuits too close to each other. It can be built much smaller than the one shown in the photograph, but since there is no reason for a tiny unit in most applications, ample room on the chassis makes the job simpler.

Use a perforated chassis board (such as Lafayette catalogue No. MS305) about $2\frac{3}{4}$ " by $4\frac{3}{4}$ ". A convenient arrangement of the parts is a straight-line layout with the input terminals at one end of the chassis and the output terminals at the other. First, mount the transistor sockets by cutting close-fitting rectangular holes in the board. Insert the socket and hold it in place with the retaining clip from the opposite side of the board. For identification, note that C terminal stands alone and B and E are close together. The resistors and condensers are mounted by

SELF-CONTAINED POWER SUPPLY uses two six-volt batteries in series to give the 12 volts for which this amplifier was designed. The higher-than-usual voltage insures true high-fidelity performance. Current drain is approximately 1.3 ma., which means you should get at least a year of normal operation before you have to replace batteries.



Picture diagram makes pre-amp wiring easy



pushing their connecting wires through convenient holes in the chassis board. If you arrange them either parallel or at right angles to each other, the finished job will have a professional appearance.

Make the connections, for the sake of convenience, as shown in the pictorial wiring diagram, before you do any soldering. Use insulated sleeving over any bare wires that might touch. Flea clips can be used for terminals where several wires come to a common point. Be sure to observe the proper polarity in connecting the electrolytic condenser.

When you have finished wiring the chassis, recheck all connections to be sure they are correct, and securely soldered.

Prepare the metal box for mounting the chassis, battery holders, switch, input socket and output cable. Mount the switch through a hole in the front half of the box (that's the half with the flanges). The phono socket mounts in the end of the box that will be near the input to the chassis. Drill a $\frac{3}{8}$ " hole in the other end of the box for the output cable. Mount the battery holders in the back half of the box so the batteries will clear the chassis when the two halves are put together.

With these parts in place, the chassis can now be mounted, using a couple of homemade angle brackets to secure it to the front of the box. Complete the electrical connections by wiring the plus lead of C1 to the center (hot) terminal of the

phono socket and connecting R1 from the center to the ground lug. Connect a wire from the ground lug to the plus tie-point on the chassis as shown in the diagram. Connect the output cable to the output tie-points on the chassis. Use flexible wire to complete the connections from the battery to the switch and chassis.

Insert the transistors into the proper sockets. Be sure to get the leads in the proper holes. The base lead (B) is always in the center; the collector lead (C) is identified by a red dot either on the wire or on the case adjacent to the wire—or, in some cases, by being spaced farther from the base lead.

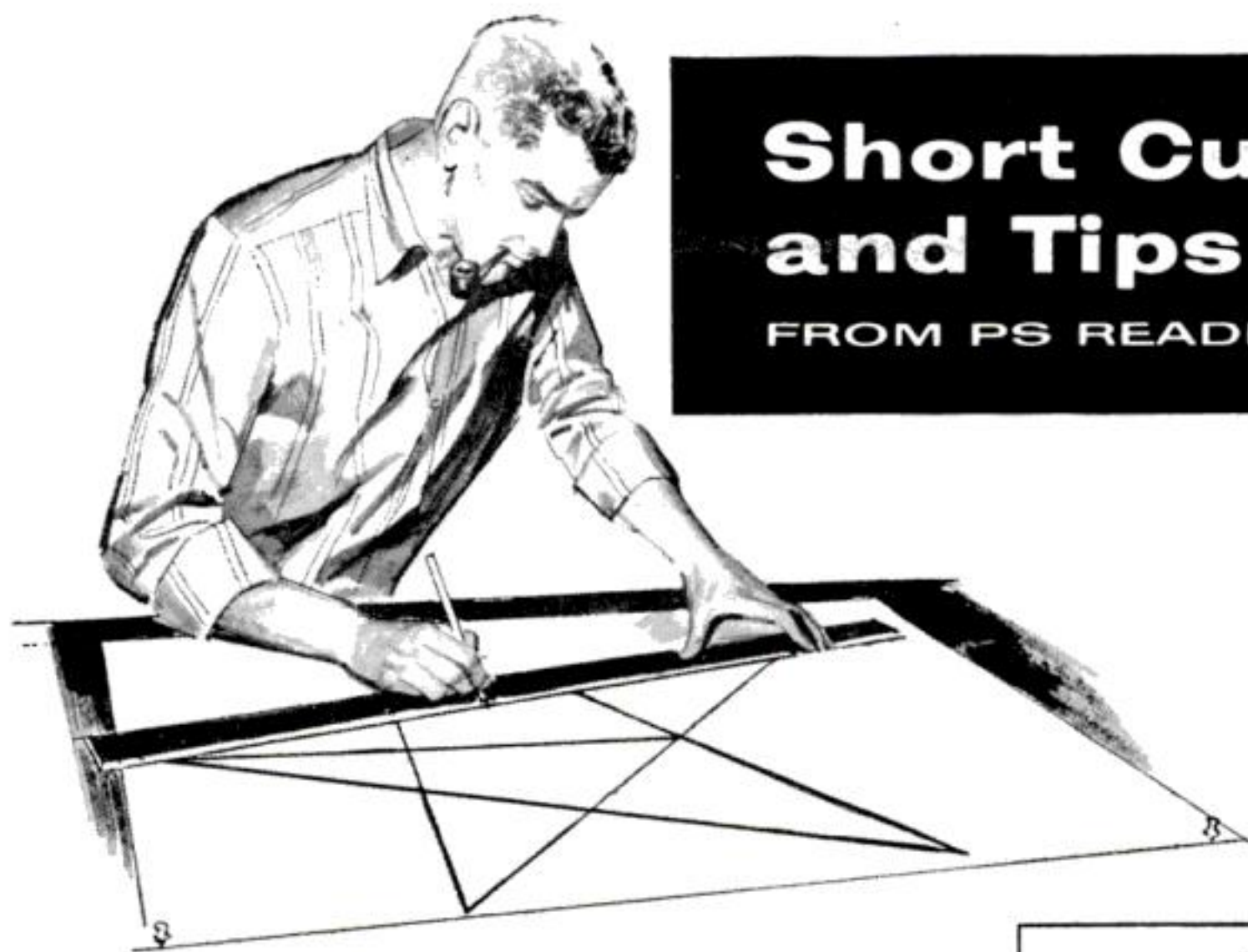
This completes the construction. Put the halves of the box together and your hum-free, noise-free pre-amp is ready for work.—Tracy Diers and Daniel Cronin.

PARTS LIST FOR TRANSISTOR PRE-AMP

(All resistors $\frac{1}{2}$ watt.)

R1:6,800 ohms
R2:27,000 ohms
R3:47,000 ohms
R4:10,000 ohms
R5:200 ohms
R6:8,200 ohms
R7:220,000 ohms
R8:10,000 ohms
R9:6,800 ohms
R10:500 ohms
R11:14,000 ohms
C1:10 mfd.
C2:160 mfd.
C3:2 mfd.
C4:160 mfd.
C5:.05 mfd.
C6:.02 mfd.

TR1:2N133A Raytheon transistor
TR2:2N130A Raytheon transistor
2 six-volt batteries, Burgess Z4 or RCA VS068
1 off-on switch, any type
2 battery holders (Lafayette part MS175)
1 perforated chassis board, 3"x5" (Lafayette MS305)
1 metal box, approx. 3"x4"x5" (Minibox CU2105)
2 transistor sockets
1 phono socket
1 pkg. flea clips (Lafayette MS-263)



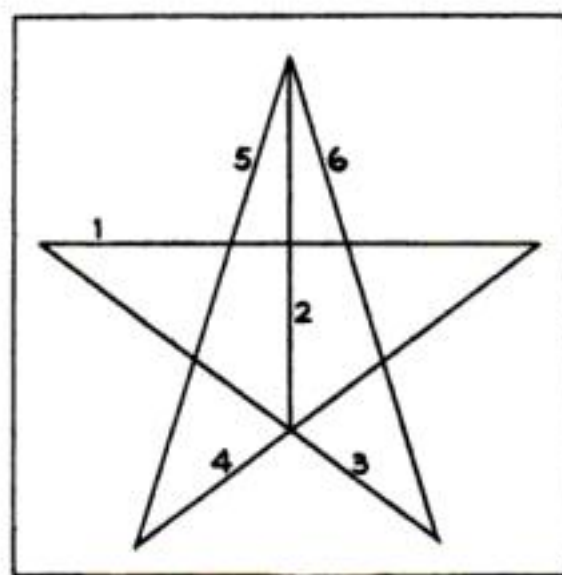
Short Cuts and Tips

FROM PS READERS

How to Draw a Five-Pointed Star

HERE'S an easy way to draw a star. Rule a horizontal line first; this sets the scale. Then draw a vertical line through the midpoint of the horizontal one. This second line should be $\frac{3}{4}$ as long as the first, with its midpoint at the intersection of the two lines. Draw the last four lines in order, each as long as the first. The result, though not geometrically exact, makes a good star for decorative purposes.—

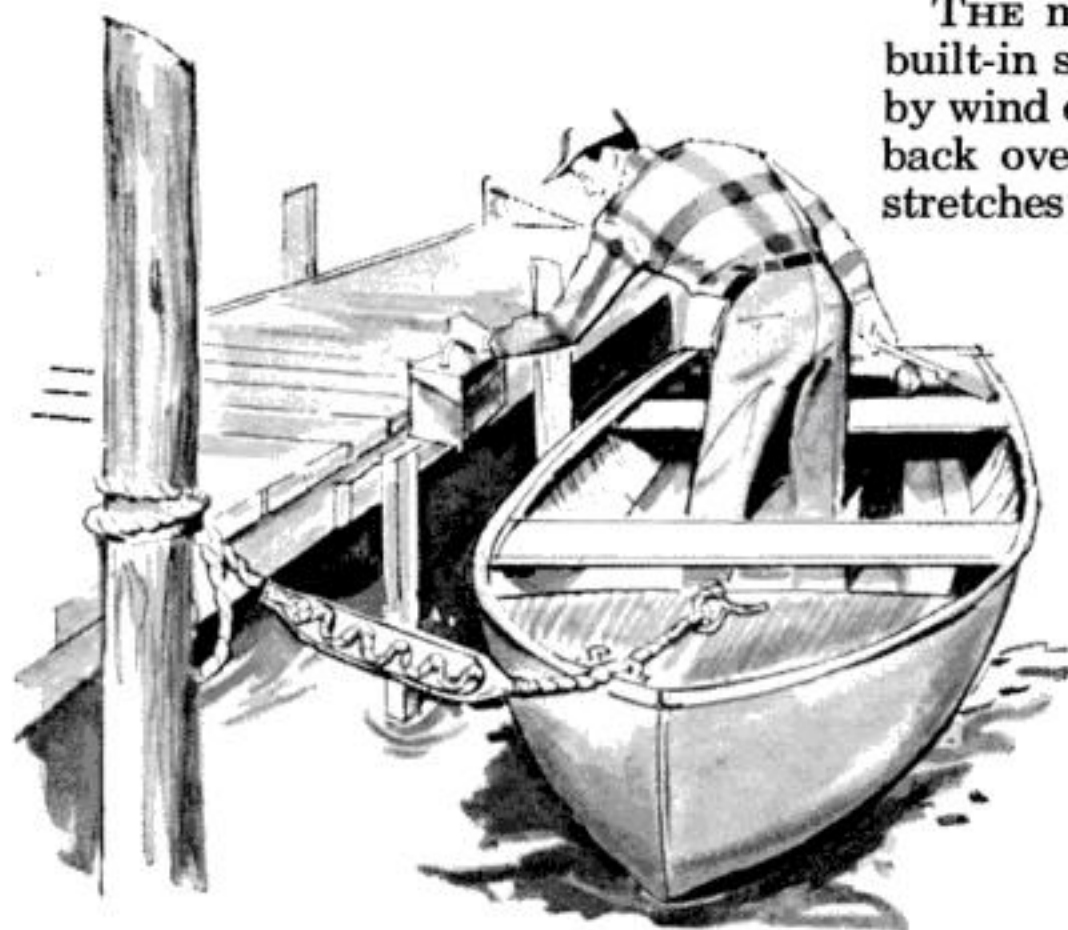
T. N. Ferren, Lynnfield Center, Mass.



Shockproof a Mooring Line

THE mooring line on my rowboat has a built-in shock cord that absorbs jolts caused by wind or waves. A bicycle-tire tube, pulled back over itself to give it double strength, stretches when the boat bounces.

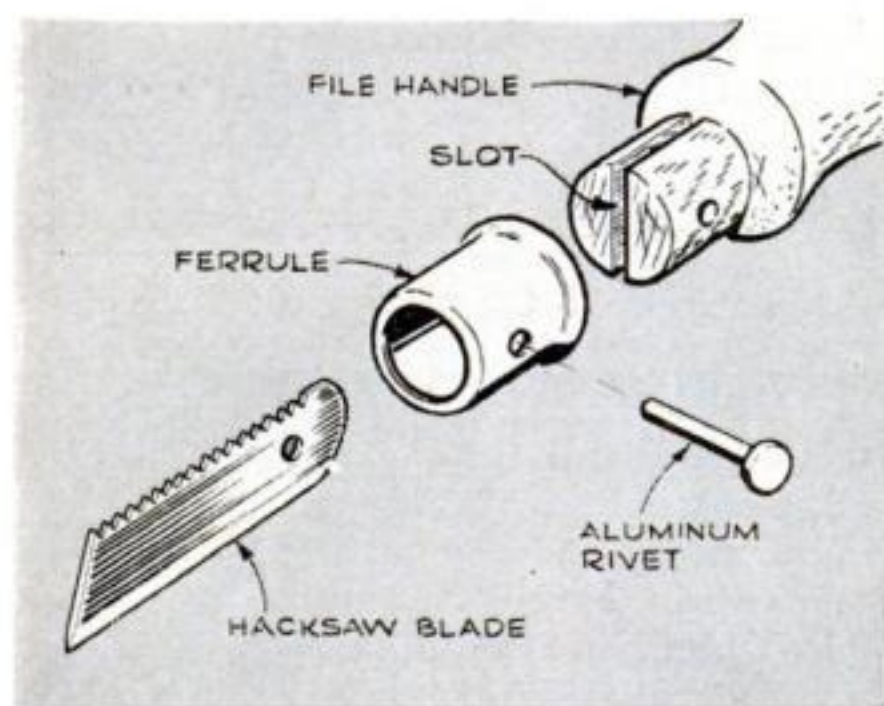
I tie a knot in the line near one end and pull the doubled tube over it, letting the tube overlap the knot by 3". Whipping the overlapped section with strong cord, I shove slack line into the tube and tie another knot. I finish the operation with a second whipping beyond this knot and smear some waterproofing compound where the line enters the tube.—*Martin Stockel, Miranda, Cal.*



Short Cuts and Tips

Extra Bookshelf in Kneehole Desk

PRESSED for book storage space, I added a 14-volume shelf to my kneehole desk. The bookshelf rests on cleats screwed to the drawer sections. Molding along the shelf's rear edge keeps books from being pushed off. —R. M. Woodbury, Natick, Mass.



Making Knife from Saw Blade

CAUGHT without a linoleum knife, I made one quickly by fastening a piece of hacksaw blade to a file handle. I cut a slot in the narrow end of the handle, first pulling off the ferrule. The blade end went into the slot and the ferrule was replaced. I drilled a hole through the ferrule and the wood that lined up with the hole already in the hacksaw blade. An aluminum rivet driven into the hole joined everything together. Then I sharpened the back of the blade to a razor edge. —S. J. Wilson, N. Hollywood, Cal.

▶▶▶To TIGHTEN a loose pick handle, slip the head off and wrap a strip of fine wire screening around the handle where the head fits. Then drive the head firmly onto the handle, sandwiching the wire between them. The wire will dig into the wood and hold the head on tightly. —Bruce J. Compton, Reno, Nev.

Simple Holder for Recipes

You can easily mass-produce this recipe holder as a gift or bazaar item. The base is a $2\frac{1}{2}$ "-by- $2\frac{1}{2}$ " square of $\frac{3}{4}$ " pine, beveled decoratively on the top edges. Drill a $\frac{3}{16}$ " hole in the base for a 6" dowel. With two #8 screw eyes, fasten a spring-grip clothespin to the dowel. Squeeze screw eyes tightly closed for a snug fit. —J. W. Rocke, Huron, S. D.



NOW! A SHOPSMITH[®] FOR ONLY \$179.⁹⁰



INTRODUCING THE

ALL NEW SHOPSMITH MARK 2



It's an 8" SAW • It's a 12" SANDER • It's a 28" LATHE • It's a HORIZONTAL DRILL — 16½" VERTICAL DRILL

Companion to the Incomparable Shopsmith Mark 5!

Here's the new SHOPSMITH everyone can afford! The all-new MARK 2 is still the famous 5-in-1 power shop that has made SHOPSMITH the most wanted power tool in America. It gives you *all* the big capacity power tools you need to build your woodworking projects from *start to finish*—does hundreds of operations! See this rugged, all-new SHOPSMITH demonstrated at your leading hardware or department store, lumber yard, or Montgomery Ward. (Price does not include motor and bench.)

® T. M. REG.

FREE Catalog!
mail coupon today
to plant nearest you!



MAGNA POWER TOOL CORP.
Dept. 105-S, Box 2808, Ft. Wayne, Ind. OR
Dept. 105-S, Menlo Park, Calif.

Please mail me your **FREE** catalog on the all-new SHOPSMITH Mark 2.

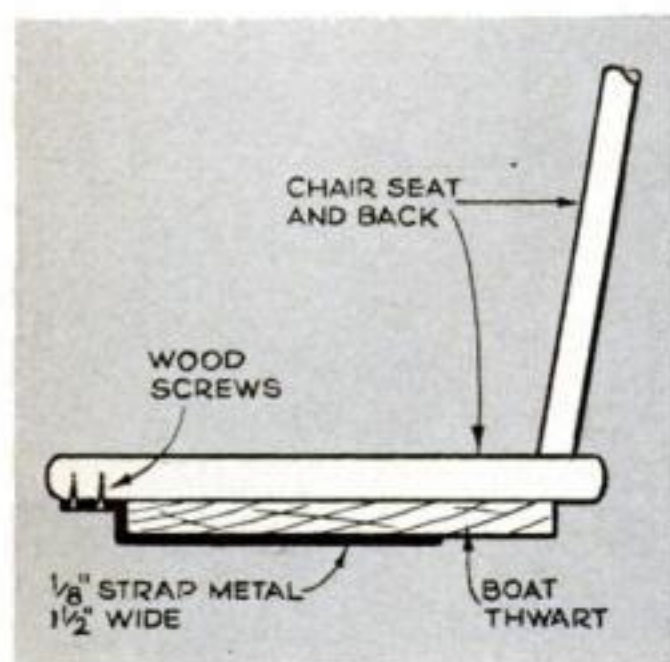
NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

If you now own a SHOPSMITH—is it a 10ER or Mark 5 _____

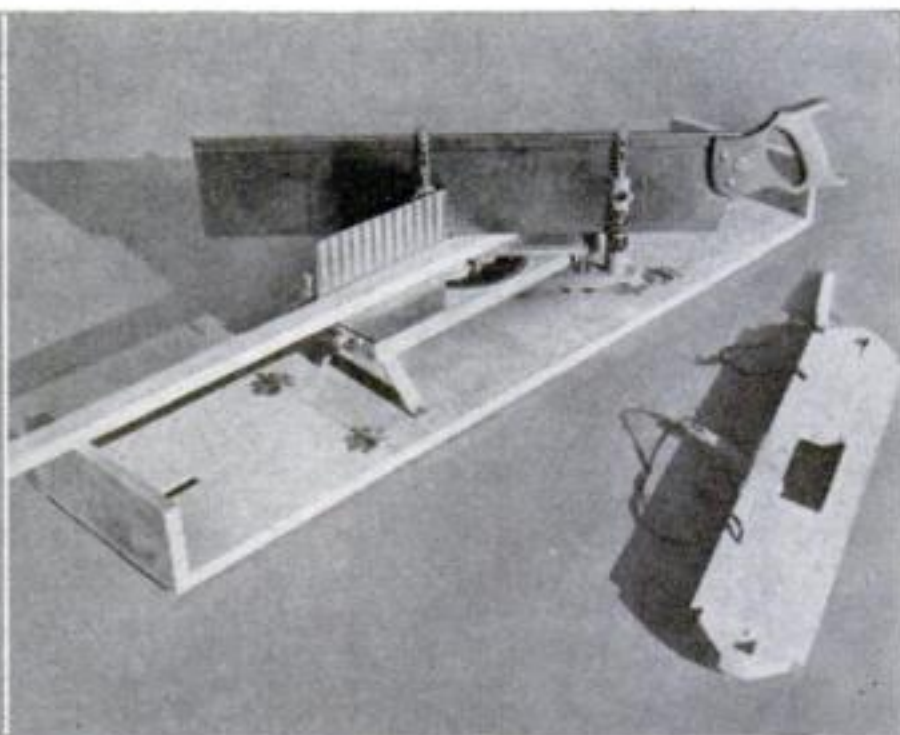
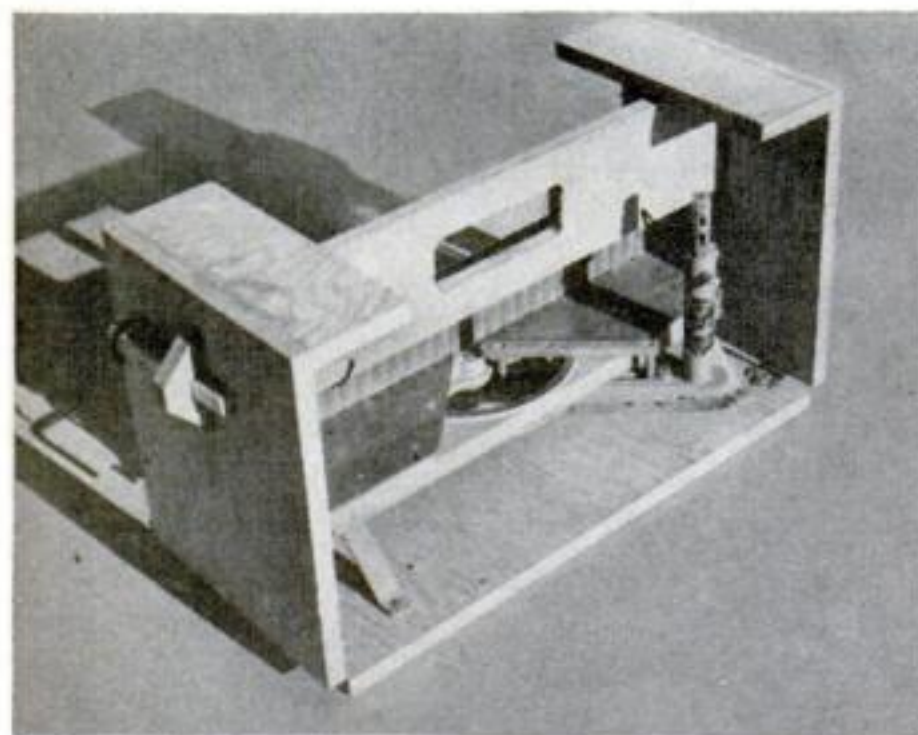
Short Cuts and Tips



Fisherman's Easy Chair

SITTING on a boat thwart for long becomes uncomfortable. You can make your next fishing trip a lot more enjoy-

able by taking along a chair with the legs cut off. Metal straps screwed to the chair bottom slip under a thwart and hold the chair firmly, making it safe as well as comfortable.



How to Make a Case for Carrying a Miter Box

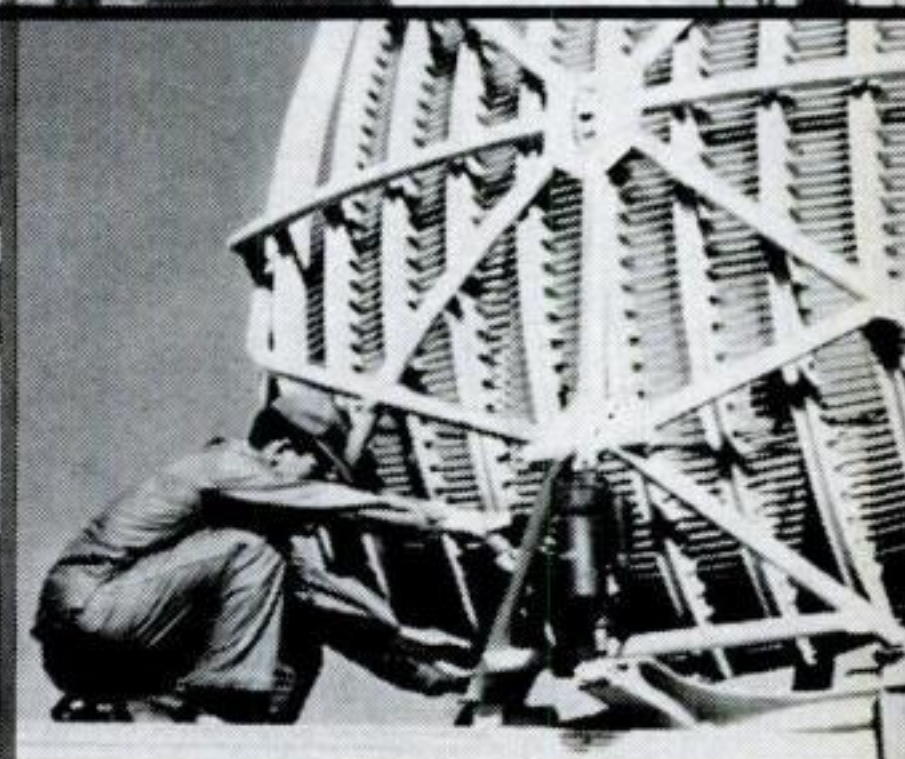
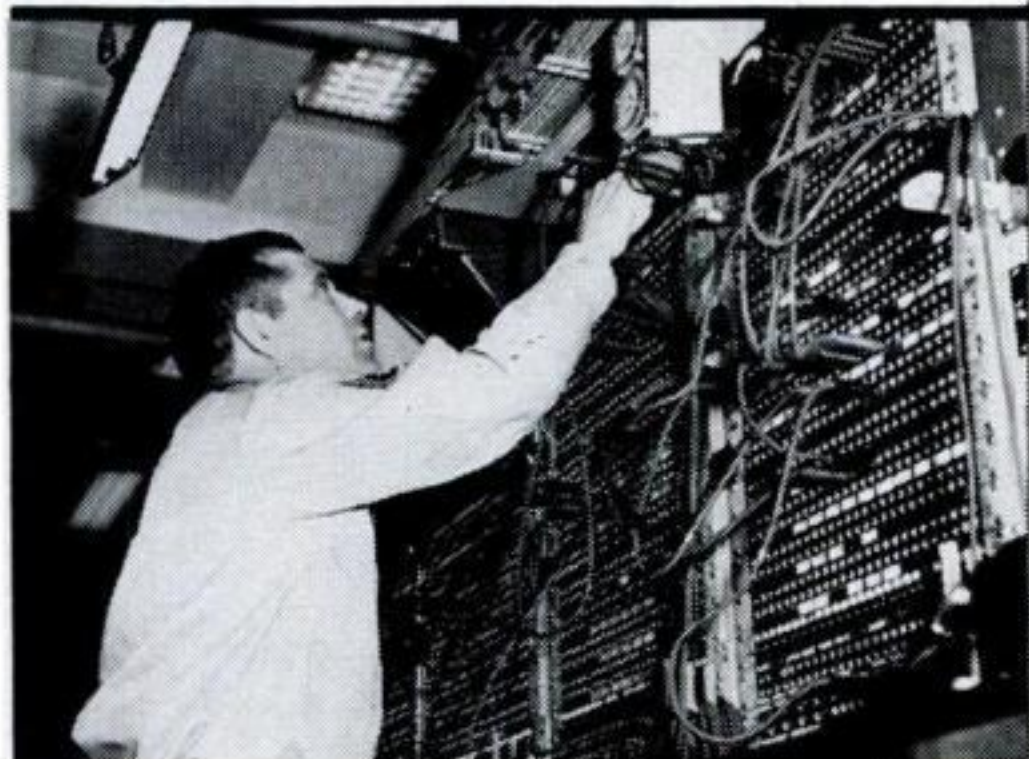
AN OPEN case you can build around a miter box protects it, makes it easy to carry and helps support long pieces of work, like molding strips.

Cut the $\frac{3}{4}$ "-plywood bottom a few inches longer and wider than the miter box and fasten the two ends to the bottom with hinges. Cut tenons with tapered ends in the carrying handle and cut slots in the end pieces to fit them. After attach-

ing the handle, cut square holes in the tenons for locking pegs.

Tie the pegs to the handle with pieces of shoelace, leaving some slack. The two short pieces that overhang the handle at each end need special attention. When the ends of the case are opened out flat, these supports should be level with the miter box bed so they can hold long pieces.—Don Engdahl, Santa Rosa, Cal.

FORMER SERVICEMEN
IF YOU
HAVE A
TECHNICAL
SPECIALTY



There's an important job and a guaranteed future for you...in the U.S. Air Force

• There is no more important job than being an Air Force specialist. For
 • he is not only a fine technician, but also a man of responsibility. On his
 • shoulders rests the vital assignment of maintaining and operating the
 • increasingly complex equipment that makes his Service the world's
 • most efficient striking force. But with this responsibility, he also knows
 • great pride...and a future that's *guaranteed*. As a technician, you, too,
 • can have this same satisfaction and assurance—in the U.S. Air Force.
 • See your Air Force Recruiter, or mail the coupon.

• **The Future Belongs to the Airman**

**Today and
 Tomorrow,
 you're better off
 in the
 U.S. AIR FORCE**

PASTE ON POSTCARD AND MAIL TO:

Prior Service Information, Dept. PS 5321
 Box 7608, Washington 4, D.C.

Please send me more information on the Air Force Prior Service Program.

Name _____

Address _____ Age _____

City _____ Zone _____ State _____

Kodak Camera Carnival

...at your Kodak
dealer's now!

See "The Ed Sullivan Show," CBS-TV, Sunday nights.



New Brownie Starflash Camera takes *color slides* as well as black-and-white and color snapshots. Built-in flashholder. Double exposure prevention. Brownie Starflash Camera, \$8.95 or \$1 down.

New Brownie Starflex Camera has hooded viewfinder, takes color slides and snaps. Brownie Starflex Camera, \$10.75. Kodak Rotary Flashholder shoots six bulbs without reloading, from \$10.95.

See your shot big and clear before you snap it with hooded viewfinder on Kodak's Duaflex IV Camera. Fast, pre-focused Kodet lens. Kodak Duaflex IV Camera, \$17.95 or \$2 down.

New Kodak Pony II Camera for 35mm color slides. Just dial for picture you want. Make one setting, shoot. Kodak Pony II Camera, \$26.75 or \$2.75 down. New Kodak Generator Flashholder works without batteries! At your photo dealer's soon.

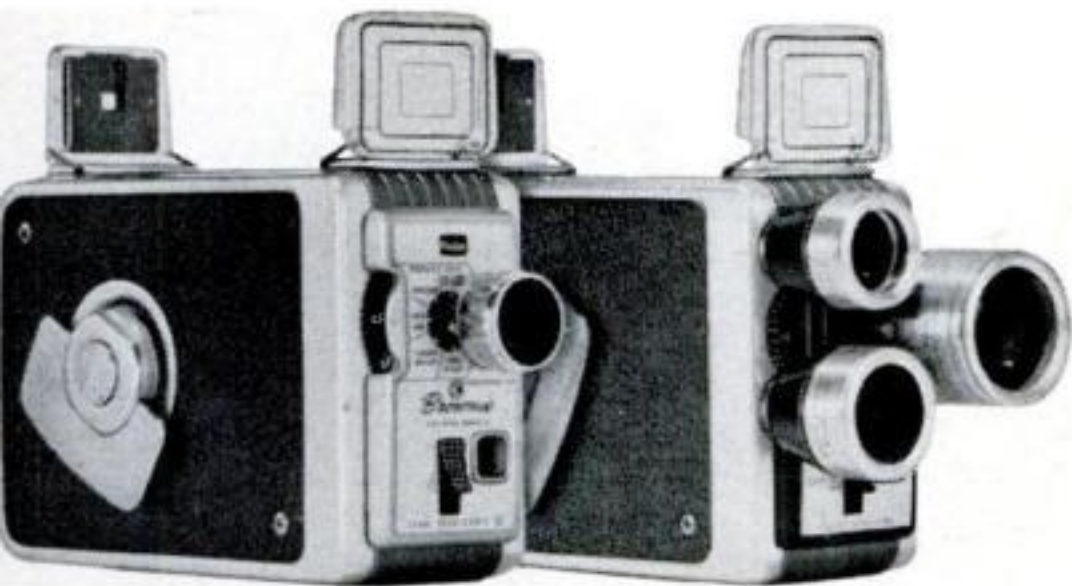
New Kodak Signet 50 Camera for precision photography has built-in photoelectric exposure meter. Extremely fine $f/2.8$ lens. Flashholder, two reflectors. Kodak Signet 50 Camera, complete, \$82.50 or \$8.50 down.



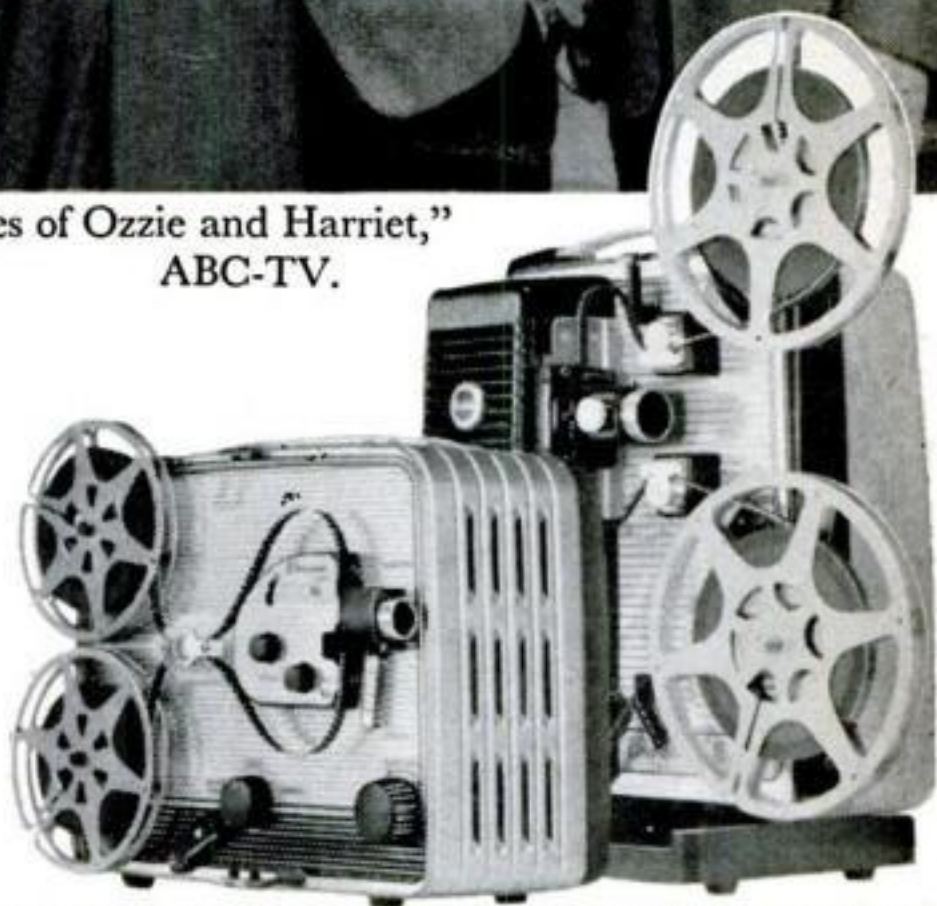
Prices are list, include Federal Tax and are subject to change without notice.

Kodak TV stars
invite you to the
most exciting
photo show
ever...

See "The Adventures of Ozzie and Harriet,"
ABC-TV.



Brownie Movie Camera, $f/2.3$ (left), takes color movies with snapshot case. Just make one setting . . . aim . . . and shoot! Brownie Movie Camera, Turret $f/1.9$ (right), gives you 3-lens range at 1-lens price—takes normal, wide-angle, telephoto shots. Brownie Movie Cameras from \$29.95 or \$3 down.



Big screen 8mm movies. You show 8mm movies 3 feet wide with Brownie 300 Movie Projector (left). Shows single frames, reverse-action. \$6.50 down. Brownie 300 Movie Projector, \$64.95. For extra-large-screen movies 5 feet wide, the Cine-Kodak Showtime 8 Projector (right), \$123.50 or \$12.50 down.



New Kodak Medallion 8 Movie Camera, $f/1.9$, loads in 3 seconds with film magazine, weighs only 23 ounces. Kodak Medallion 8 Movie Camera, $f/1.9$, \$106.50.

Shows color slides big-as-life. Kodak 300 Projector is only 5 inches high, easy to carry as a portable radio. Kodak 300 Projector, \$64.50 or \$6.50 down. New Kodak Cavalcade Projector shows slides *automatically*! You turn it on . . . it does the rest. At your dealer's soon!

EASTMAN KODAK COMPANY, Rochester 4, N.Y.

Kodak
TRADE MARK

Short Cuts and Tips

How I Got Rid of Soggy Soap Cakes

I PRESS a beverage-bottle cap into each new cake of soap before leaving it in the soap dish. This keeps the cake out of water, where it used to become soggy. As a heavy soap user (I am a surgeon) I find that each cake of soap so protected lasts an average of 25% longer than the unprotected ones used to last.—*Dr. Coen Oosthuysen, Vereeniging, Union of South Africa.*



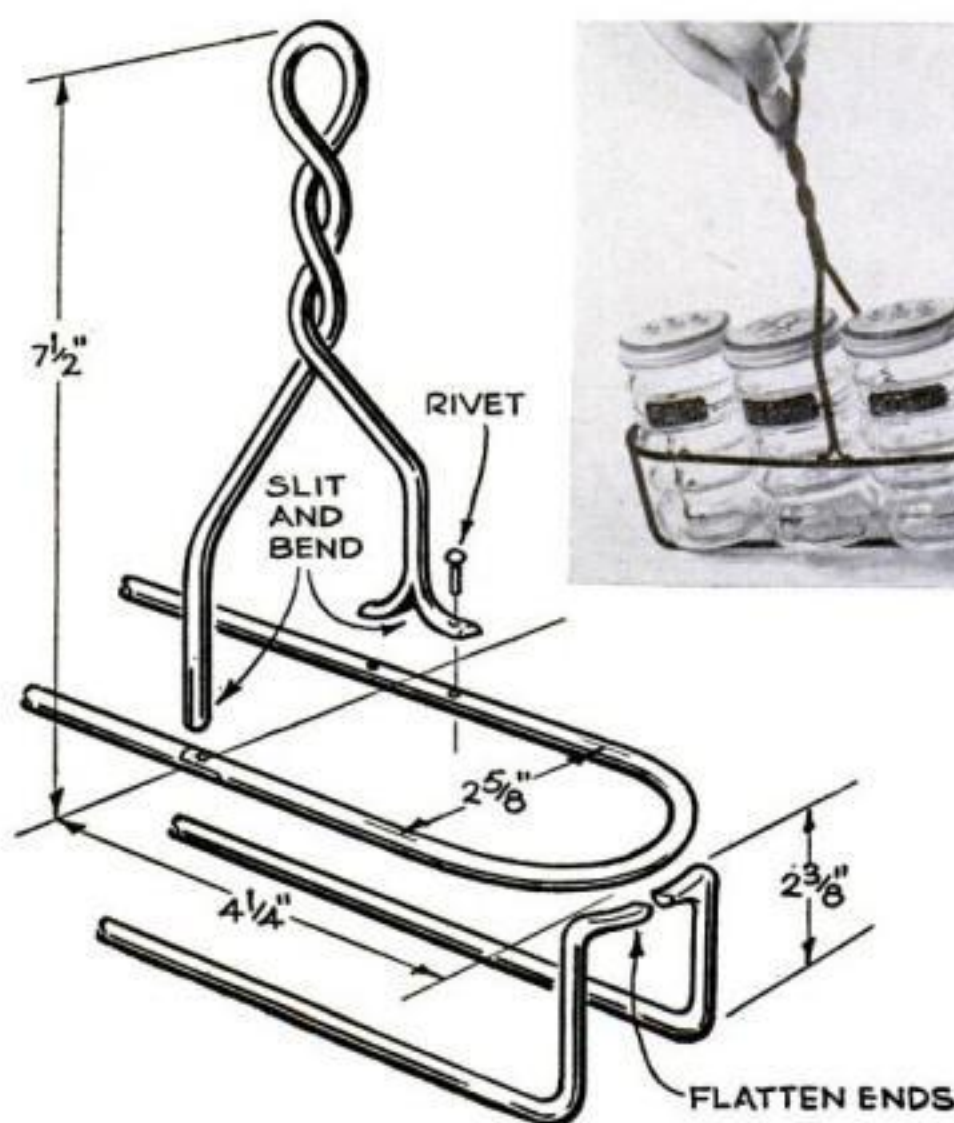
►►►SPRAYING oil on tools is the easiest way to keep a basementful of them rust-free. I buy a quart of lubricating oil for about 50¢ and a dispenser bottle made to hold window-cleaning fluid costs less than that. The oil spurts out in a fine spray,

instead of a stream, if one part wood alcohol is mixed with every four parts of oil. Evaporation removes the alcohol quickly, but beware of using an open flame immediately after spraying.—*Col. J. A. Anderson, Washington, D. C.*

This Spice Rack Needs No Welding

SPICE jars from the five-and-ten make an attractive set when racked in a wire holder. You can make a holder from 3/16" brazing rod, which is sold in 3-foot lengths at many hardware and auto-supply stores.

Bring the ends of the jar-encircling strip together in a lap joint and rivet them. Then bend the ends of the base rods, flatten and rivet them together too. Form an eye in the handle and slot its ends with a hacksaw. The halves that are formed by this slotting are then bent out flat and riveted securely to the base of the rack.—*Sam Grant, NYC.*





HOW TO BE A GASOLINE MONEY SAVER

"SAVE MONEY as you drive," says George, the gasoline saver . . . claims he puts a lot of extra spending money in his pocket with what *he* saves on gasoline . . . in ways like these:

He keeps his engine tuned . . . plugs clean for full firing . . . distributor points and breaker gap clean and correctly set . . . air cleaner unchoked by dirt, a free-working, properly adjusted automatic choke valve to avoid an over-rich mixture.

He saves as he drives. Avoids gasoline-wast-

ing jack rabbit starts and unnecessary spurts and slow-downs . . . coasts up to red lights with minimum braking . . . shuts off his engine instead of costly idling.

Other gasoline saving factors—fully inflated tires and aligned wheels push easier . . . the right engine oil (see below) saves starting and running drag . . . a car needs more than three times the power to do 70 instead of 35 and gives less than half the economy. "Also," says he, "I get top mileage with Texaco Sky Chief Supreme gasoline."



Four to forget—just one to remember

Now you can forget about motor oil grades. New all-temperature Havoline Special 10W-30 combines the advantages of 4 grades in one. Your car always gets full-bodied, free-flowing lubrication under *every driving condition*—cold starts—intense heat—any climate—any season. Now . . . Havoline "thinks for itself" to save your thinking about seasonal grades. Also cleans as you drive to wear-proof your engine. Get it from your Texaco Dealer, *the best friend your car has ever had.*

THE TEXAS COMPANY

TEXACO DEALERS

IN ALL 48 STATES

Texaco Products are also distributed in Canada, Latin America, and Africa.



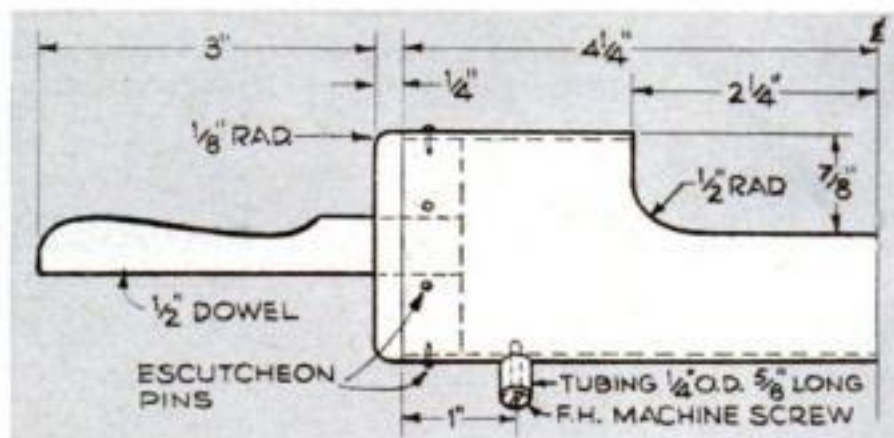
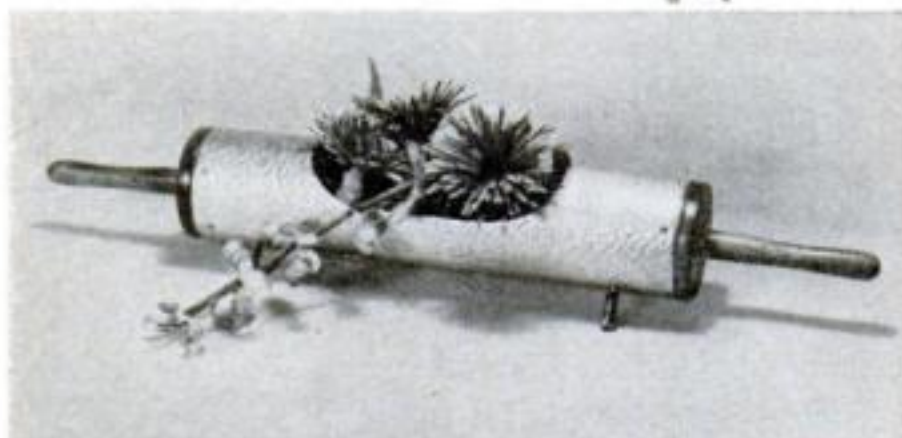
APRIL 1958 223

Short Cuts and Tips

Spread Your Mortar with a Calking Gun

It's easy now to point up the brickwork of a chimney. I squeeze mortar from a used cartridge-type calking gun. I mix the mortar to a smooth consistency and first thoroughly wet down the section to be repaired.

—Joseph J. Papp, Dayton, O.



Kitchen Planter Shaped Like a Rolling Pin

THIS rolling-pin planter filled with a small-rooted house plant or artificial foliage makes a cheerful corner-filler for the kitchen or dining nook.

Make it from an 8 1/2" length of 2" copper or aluminum tubing. File ends square and cut out the plant opening with a coping saw. File the cut edges smooth and finish with emery paper. Slide the tube over a round metal bar to back it up, then emboss the surface with a hammer.

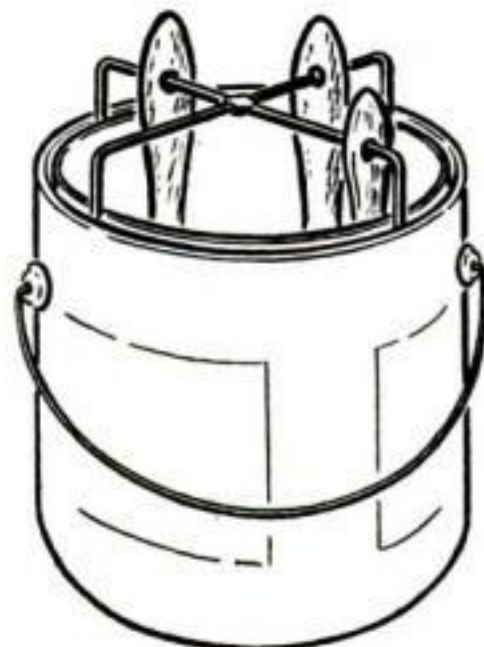
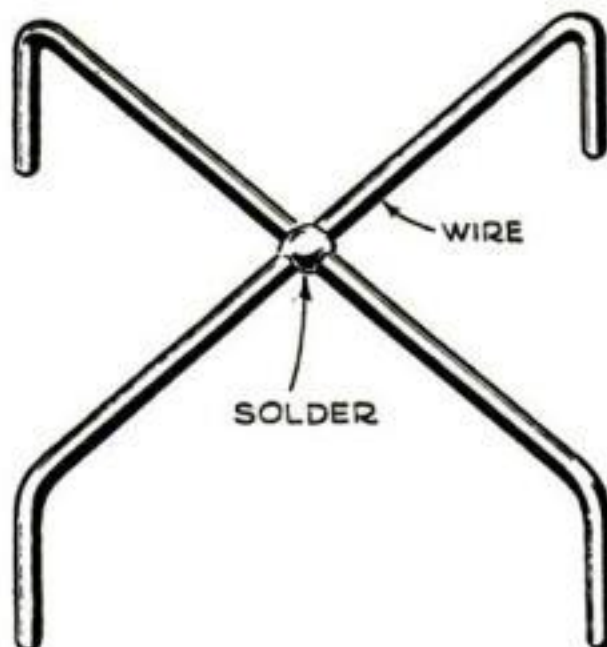
Turn the two end pieces from 3/4" maple and drill holes in them for handles turned from pieces of 1/2" dowel. Use escutcheon pins to hold ends in the tube.

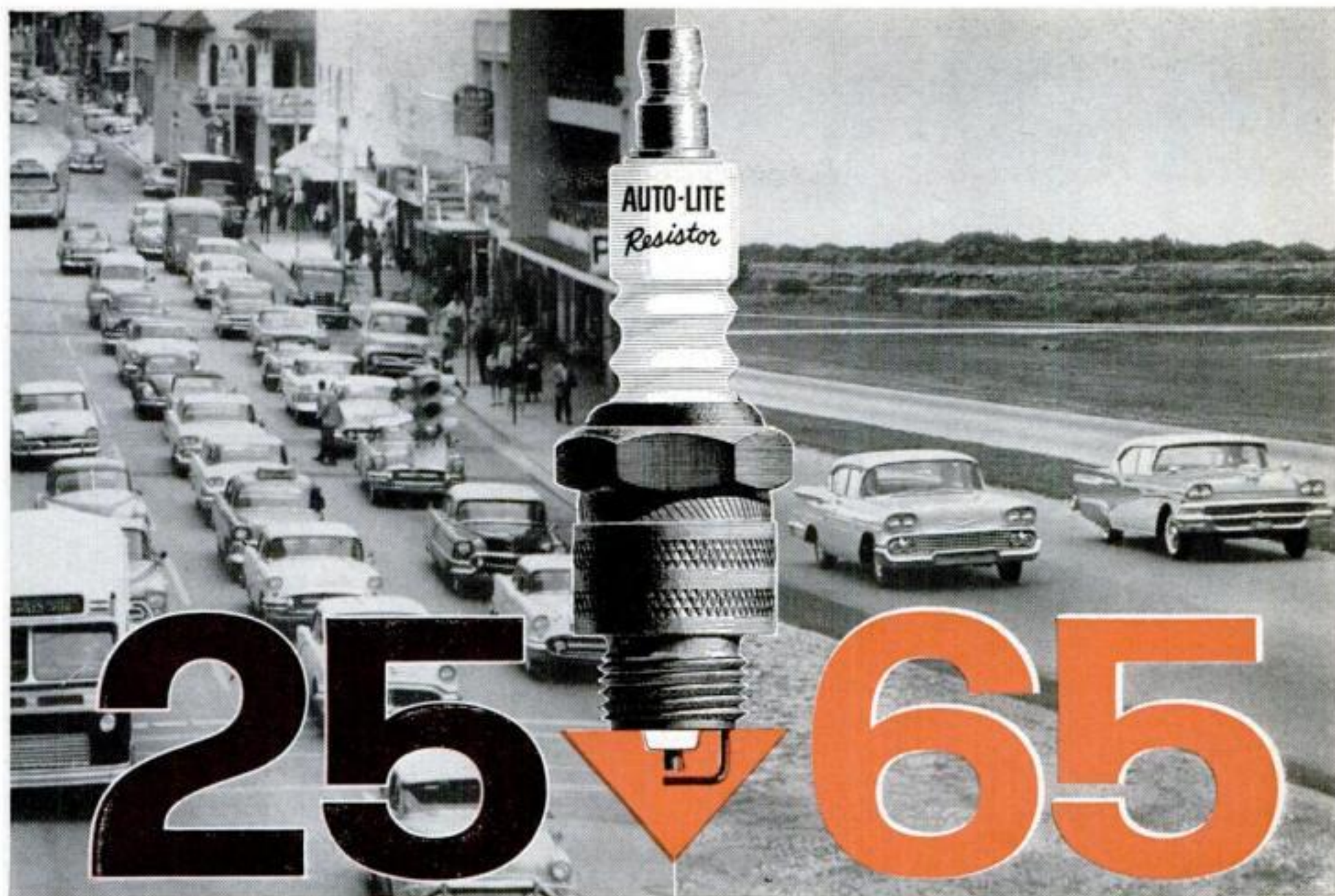
Make legs from 1/4" tubing and flat-head machine screws, and fasten them in holes tapped in the bottom of the planter.

Polish metal parts, stain the ends and apply clear lacquer overall. Coat with asphaltum inside for use with live plants.
—R. J. DeCristoforo, Los Altos, Cal.

Wire Frame for Hanging Brushes

A BRUSH cleaner works best if brushes are suspended above the container bottom. You can make a frame by soldering or tying two pieces of coat-hanger wire together. Drill holes in the brush handles, big enough so that they can slip around wire bends.—W. B. Eagan, Floyds Knobs, Ind.





IN TOWN TRAFFIC . . . some spark plugs, designed for high speeds, become fouled and cause misfiring and loss of power when driven at low speeds.

ON THE HIGHWAY . . . some spark plugs, designed for low speeds, misfire causing power loss and invite destructive pre-ignition when driven at high speeds. Why gamble when . . .

Auto-Lite Resistor Spark Plugs with **POWER TIP** "Fire Up" your engine* at all speeds!

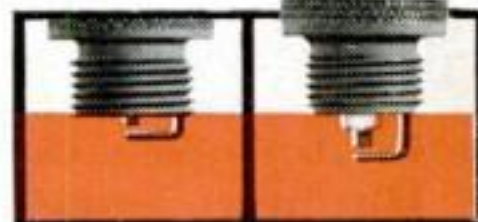


If you drive at both town-traffic and highway speeds, here's why you should use Power Tip . . . the first spark plug ignition-engineered for today's engines and today's driving.

At low speeds, the projecting Power Tip is in the thick of combustion where it gets hot quicker and stays hot to burn fouling deposits away *clean*. At higher speeds, the projecting tip is in the path of the incoming air-fuel mixture where it stays cooler to effectively *check* power-robbing pre-ignition. Ask your garage or service station to install Auto-Lite . . . the *only* spark plugs with Power Tip . . . and start enjoying top performance and economy from your car at *all speeds*.

*Power Tip, with or without Resistor, is ignition-engineered for overhead-valve V-8 engines and for most overhead-valve 6-cylinder engines in all these cars—Buick, Cadillac, Chevrolet, Chrysler, De Soto, Dodge, Edsel, Ford, Hudson, Imperial, Lincoln, Mercury, Oldsmobile, Nash, Packard, Plymouth, Pontiac, Rambler, Studebaker.

YOU CAN SEE
THE BIG NEW
DIFFERENCE IN
SPARK PLUGS!



Ordinary Tip

Power Tip

Power Tip protrudes farther into the combustion chamber for better ignition. Fuel burns more evenly and completely to give top performance and economy at *all speeds*.

AUTO-LITE. RESISTOR SPARK PLUGS WITH POWER TIP

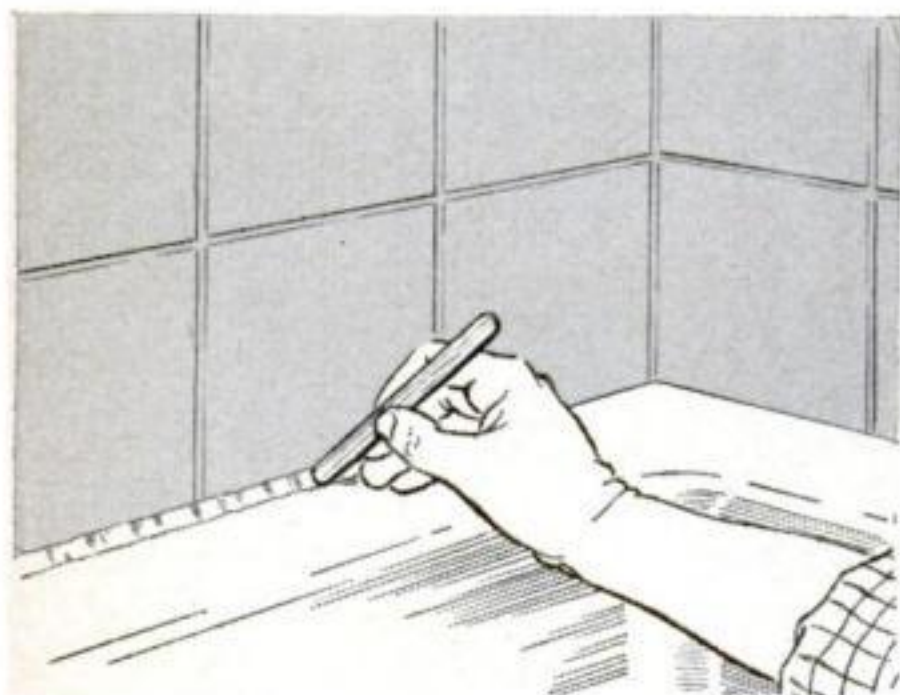
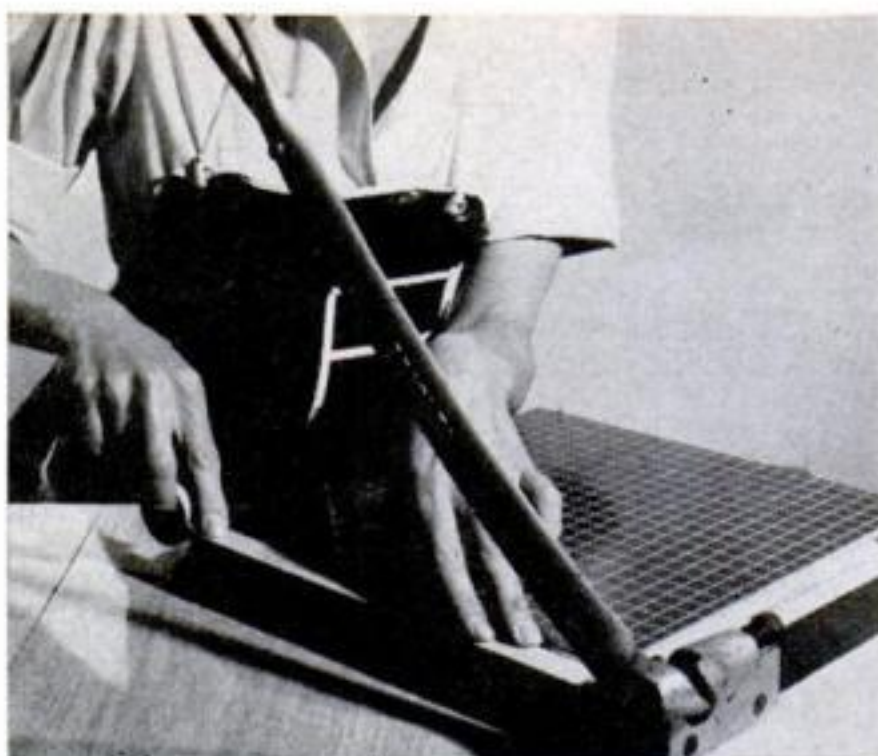
Auto-Lite makes a complete line of spark plugs, including Standard, Resistor, Small-Engine, Transport, Aircraft, and Diesel-Starting.

APRIL 1958 225

Short Cuts and Tips

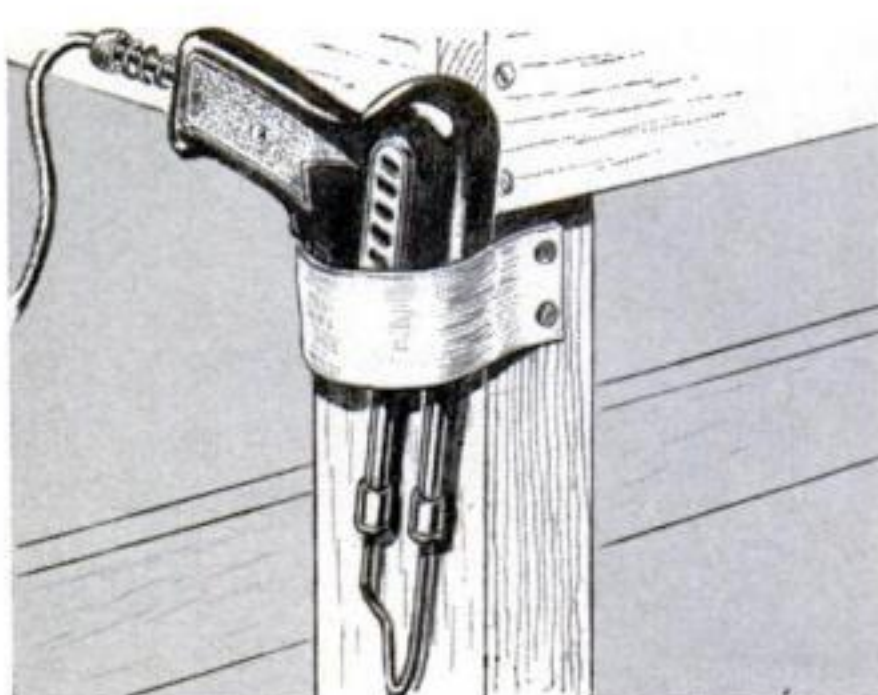
How to Skid-Proof a Trimmer

MANY a print is ruined because it slips as the trimmer blade is coming down for the cut. Slipping can be largely eliminated by sticking a strip of masking tape, as a hold-fast, along the board's edge.—*Eugene M. Hanson, Los Angeles.*



Filling Cracks in a Tiled Wall

ALL I use to repair cracks between the bathtub and the tiled wall is some grout and an ice-cream stick. I push grout into the cracks and smooth it into a neat fillet with the curved end of the stick.—*Paul S. Lederer, Silver Spring, Md.*



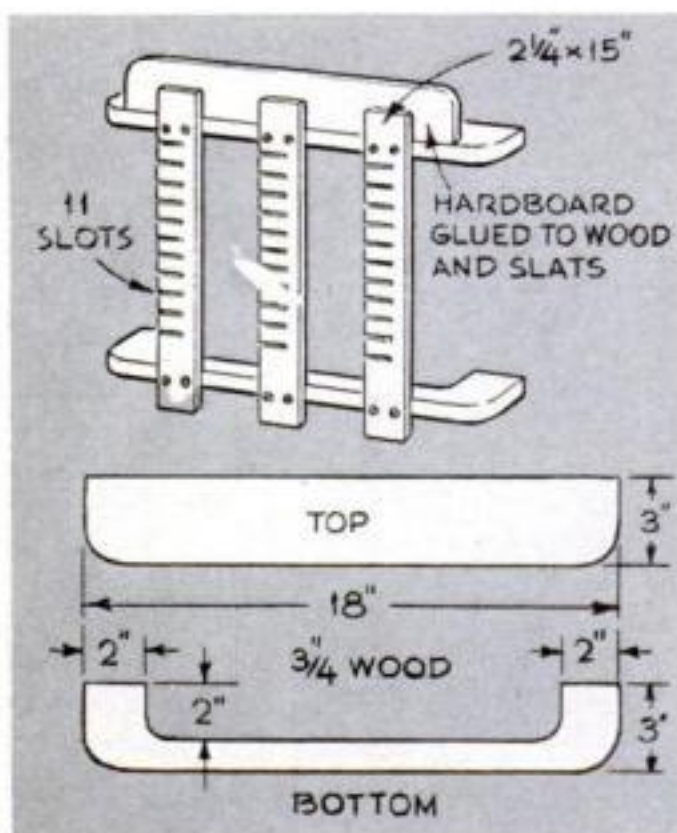
Holster That Soldering Gun

ALWAYS handy for a quick draw, my soldering gun slips into a workbench holster. I made the holster by nailing a strip of leather to one of the bench legs; some toy gun holsters would work as well.—*J. C. Branstetter, Colma, Cal.*

This Rack Holds Both Kinds of Ties

THREE "ladders"—slotted strips of hardboard screwed to wood crosspieces—make this tie rack. Cut $\frac{1}{8}$ " kerfs in each strip with a dado blade, or cut pairs of kerfs with a handsaw and chip out the ends.

If you're mounting the rack on a flush door, the lower crosspieces must be U-shaped for tie clearance. Face the upper crosspiece with a strip of hardboard to hold clip-on bow ties.



*These men chose
from 127 courses—
so can you!*



Pvt. Ted W. Gill
Comstock, Texas
Graduate,
Comstock High School

"I'm getting the engineering training I wanted, thanks to the Army's technical training program for high school graduates. My Army Recruiter showed me all the different courses I could pick from. I chose Construction Surveying. The course was even better than I thought it would be. If you'd like to pick just the training you want, the Army sure offers you the best deal."

Pvt. Kenichi Isagawa
Maui, Territory of Hawaii
Graduate,
Baldwin High School



"If you're not going to college, the best way for a high school graduate to get just the training he wants is to enlist for the Army's technical training program. I picked a Metal-working course and learned the trade I wanted. Now I'm working right in my field. Only the Army offers you choice of schooling, so find out about it from your Army Recruiter."

Seniors—get all the details on how high school graduates can choose their technical training before enlistment from 127 modern courses. Mail this coupon for your free booklet today. Or for immediate counseling visit your local Army Recruiter. He's listed in the phone book and will give you all the facts—at no obligation!

THE ADJUTANT GENERAL
Department of the Army
Washington 25, D. C.
Attn: AGSN

PS-4-58

Please send me the free Army booklet telling how high school graduates can choose their technical training before enlistment in Modern Army Green.

Name

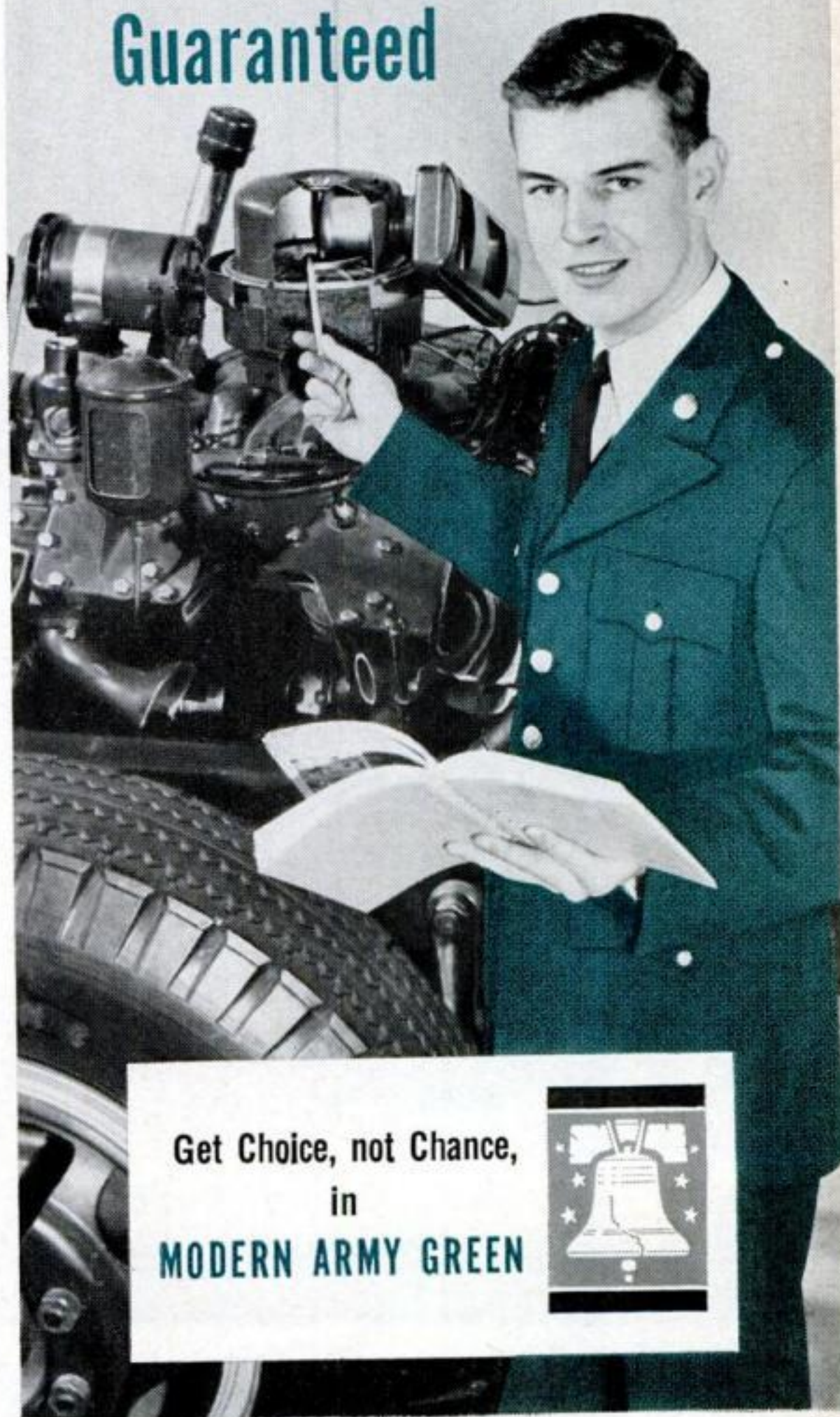
Address

City State

Date of Graduation

*Ready for you!
America's Choicest Uniform!*

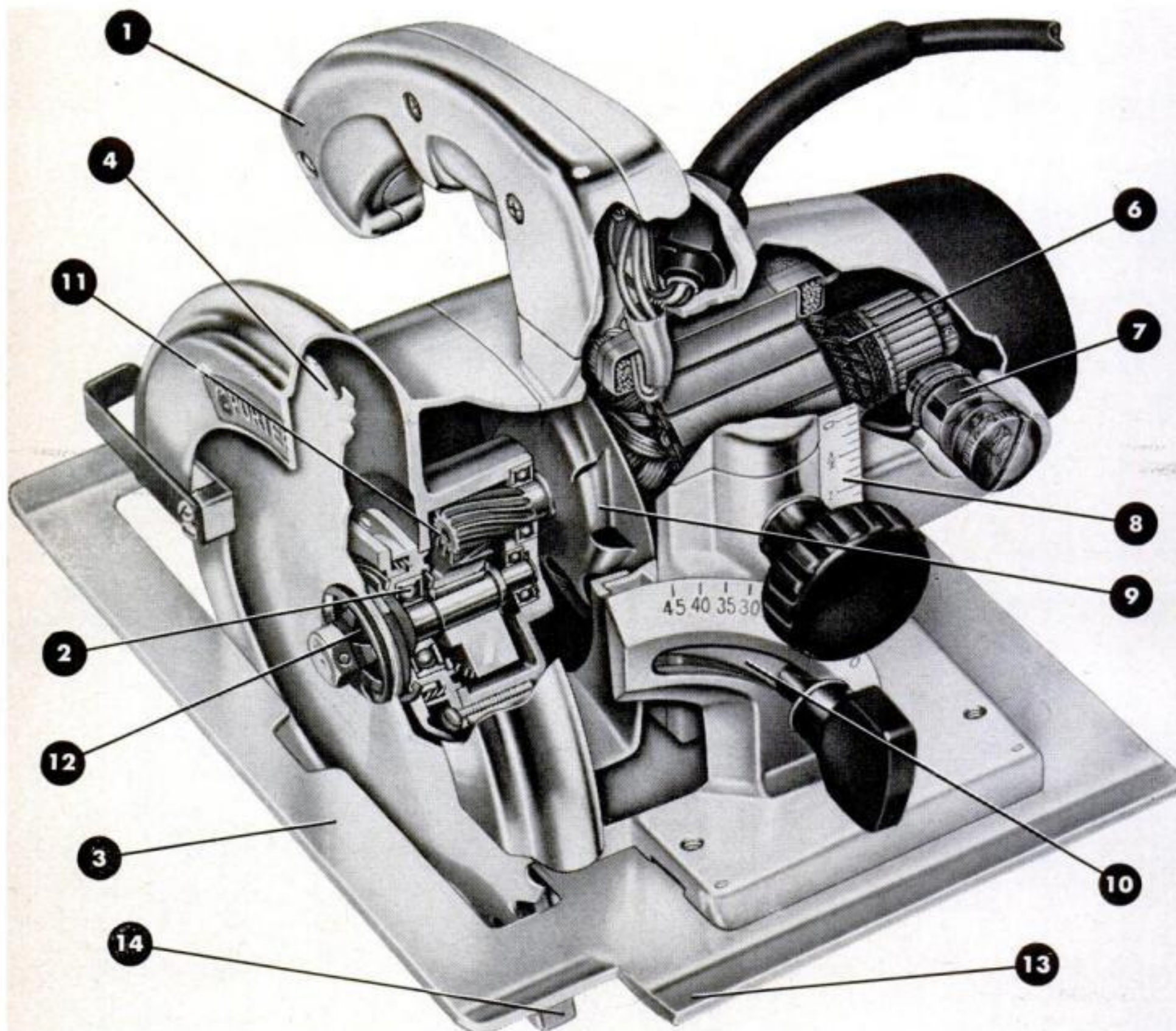
Only in MODERN
ARMY GREEN is your
Trade Schooling
Guaranteed



Get Choice, not Chance,
in
MODERN ARMY GREEN



PORTER-CABLE



1 BALANCE—Comfortable, contoured handle is specially designed and located for easy one-hand operation and for operator comfort on every cut... in any position!

2 PRECISION BALL BEARINGS—Heavy-duty, oversize ball bearings are used THROUGHOUT; grease packed at factory for life time trouble-free service.

3 WIDE WRAP-AROUND BASE—Heavy-duty machined base projects on both sides of blade to provide full support and greater stability on cuts from either direction.

4 CHROME-PLATED BLADE—Chrome plating gives blade extra-hard

cutting edge for longer life. Standard equipment on all new models.

5 GEAR LUBRICATOR—Keeps gear chamber well lubricated without having to dismantle saw. Simple twist of cup ring injects grease onto gear and pinion. (Not shown on drawing.)

6 PRECISION MACHINE-WOUND ARMATURE—Features a newly-developed winding technique which assures identical electrical and physical characteristics of the coils. Coils are nylon-clad and insulated for maximum power and top performance.

7 HEAVY-DUTY BRUSHES AND BRUSH MECHANISM—Spring-loaded car-

tridge type brushes are self-adjusting. Specially designed for better commutation and peak performance.

8 CALIBRATED DEPTH SCALE—Eliminates guesswork. Simply loosen depth adjustment knob and instantly raise or lower saw to desired depth as indicated on the scale.

9 DUST BLOWER—Specially designed to maintain high efficiency of motor and keep cutting line clear.

10 PRECISION ANGLE SEGMENT—Quick and easy to set for accurate bevel cutting from 0° to 45°. Weight of saw is held by heavy die castings at any depth or angle setting.

11 PRECISION MACHINED GEARS—Hardened for greater tooth strength, larger contact area, peak performance and longer life.

12 KICKPROOF CLUTCH—Eliminates kickback. Protects operator. Prevents motor and switch burnout.

13 SINGLE LINE OF CUT—Only one sighting line to follow on any cut—whether straight, angle or bevel.

14 SAFETY "NO-DRAW" GUARD—Patented miterlip on leading edge prevents jamming at start of any cut, and eliminates "drag" during the cut. Positive action of new coil spring returns guard immediately after cut is completed.

SAWS

are the world's finest...

HERE'S WHY: When it comes to designing a **better** saw — you can depend on Porter-Cable to do it—and do it first! Typical of Porter-Cable's fifty years of leadership are these three models—the newest additions to the famous line of Porter-Cable saws. Today, more than ever, it pays to see these quality saws at your Porter-Cable dealer. You'll get more cutting power... more satisfactory use... more professional features... more lasting value... at special low introductory prices!



LIGHTWEIGHT 6 1/2" SAW

A 6 1/2" lightweight saw with full professional construction. 10-amp. motor for rugged cutting jobs. Perfect for all framing and roughing cuts.

Model 146A \$69.50

146A Saw, in handy Builder Kit, with rip guide for fast, accurate ripping and steel carrying case. **Model 146Ak Saw Kit \$83.50**



RUGGED 7" SAW

A rugged 7" all-purpose saw with a full 12-amp. motor to give you power and speed usually found only in higher priced saws. Provides trouble-free, dependable service on every type of cutting job. **Model 115A \$79.50**

115A Saw, in handy Builder Kit, with rip guide for fast, accurate ripping and steel carrying case. **Model 115Ak Saw Kit \$93.50**



HEAVY-DUTY 8 1/4" SAW

A low-priced, heavy-duty 8 1/4" saw with rugged 13-amp. motor. Designed especially for the builder who wants added power with big cutting capacity. Safety features include auxiliary front blade guard. **Model 168 \$99.50**

168 Saw, in handy Builder Kit, with rip guide for fast, accurate ripping and steel carrying case. **Model 168K Saw Kit \$113.50**



PATENTED DESIGN of telescoping guard eliminates jamming and "drag" during any cut, even compound miter.



HANDY GEAR LUBRICATOR keeps gear and pinion well lubricated without having to take saw apart.



EASY TO HANDLE on any cut — because of light weight and balance. Ideal for cut-off and trimming operations.



EXCLUSIVE auxiliary front blade guard, on Model 168 only, covers saw teeth even on shallow cuts.



ABRASIVE BLADES are available for cutting metal, stone, masonry, plastics and other problem materials.



**SAWS • BELT SANDERS • FINISHING SANDERS
DRILLS • ROUTERS • PLANES**

In Canada: write Porter-Cable, Ltd., Box 5019, Ontario.
Canadian prices slightly higher.

SEE YOUR DEALER — OR MAIL COUPON TODAY!

PORTER-CABLE MACHINE CO.
8154 Marcellus St., Syracuse 4, N. Y.

Please send me complete information on your new Saws and name of my nearest dealer.

Name _____

Address _____

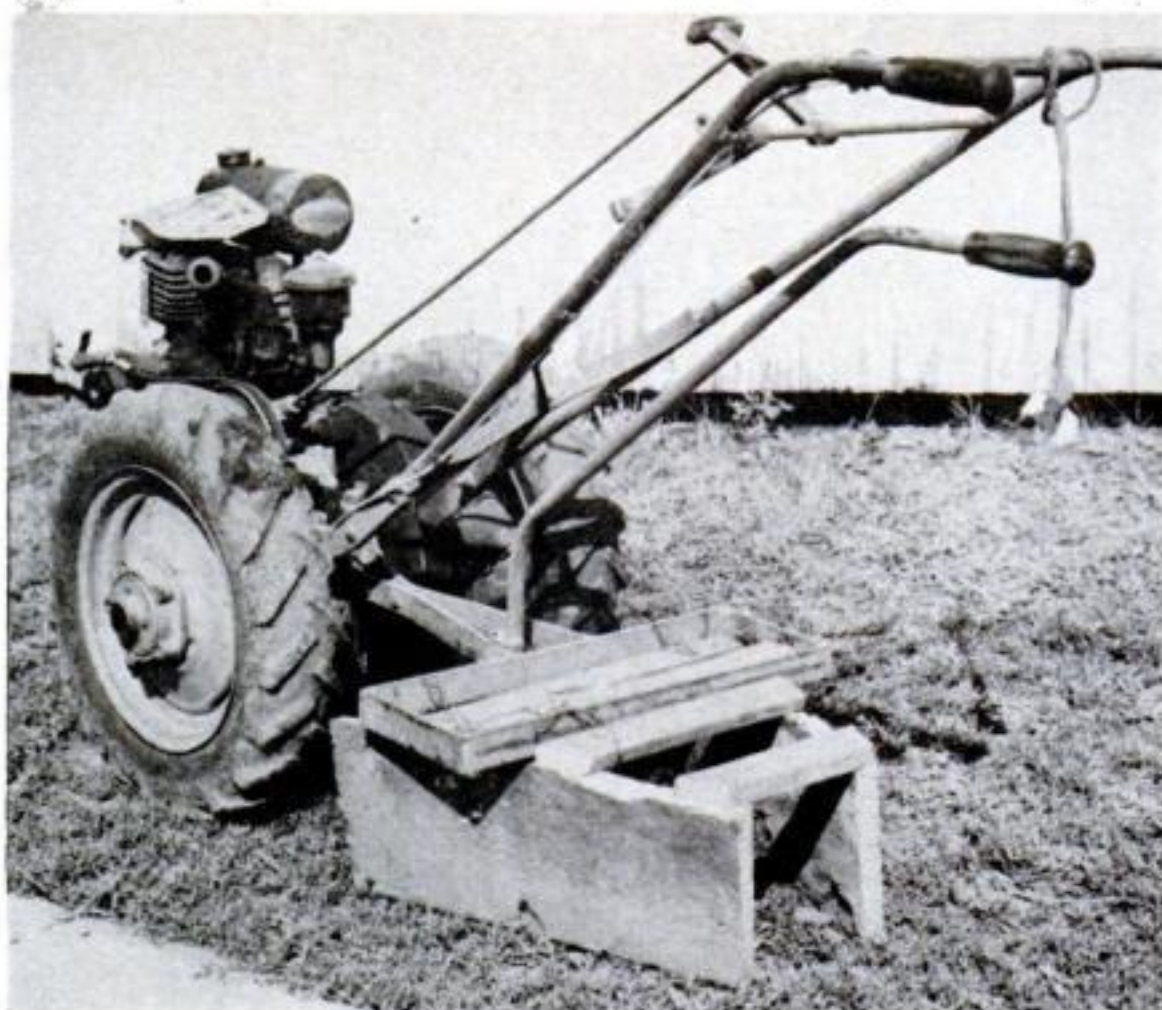
City _____ Zone _____ State _____

Short Cuts and Tips

Backfill Attachment for Garden Tractor

FURROWING the garden for potato planting is a cinch with the garden tractor. But I still had to backfill with a hoe. Now I've mechanized this unpleasant job by replacing the plow with my own V-shaped attachment when the time comes to close the furrows.

—Mark Collier, Durant, Iowa.

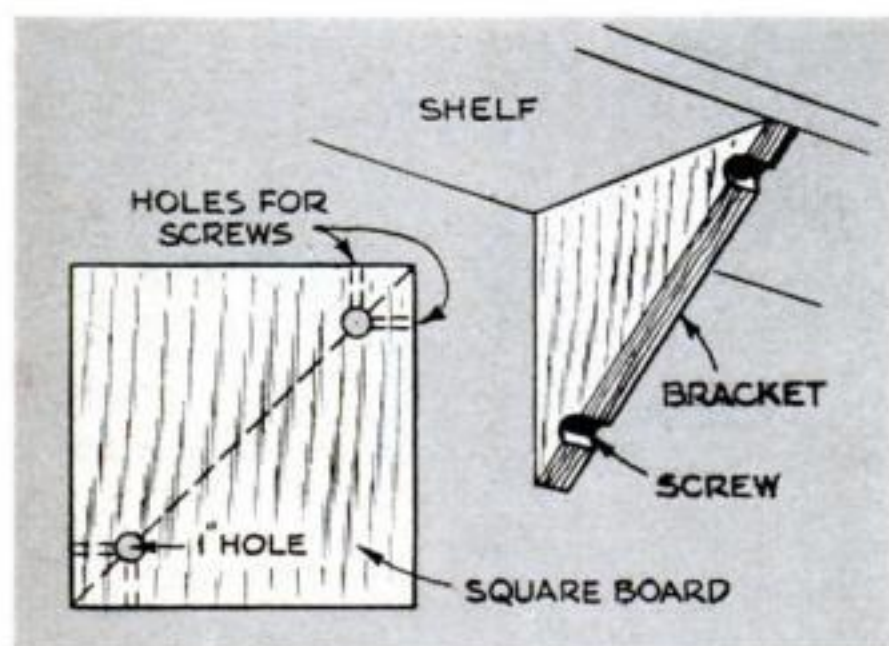


▶▶▶ HERE'S an easy way to mark a sill for the anchor bolts that are set in masonry slabs or walls. Daub paint on the bolt ends and set the wood sill down on top of them, positioned as for installation. Lift the sill off and drill bolt holes precisely where the paint marks are.

—Blanche Campbell, Las Vegas, Nev.

▶▶▶ TO SPLICE broken structural tubing I use a length of slightly smaller diameter as a dowel pin. I weld four beads along this pin, spacing them equidistantly. After driving the pin into both openings in the broken tubing, I weld the broken edges together for a quick, effective fix.

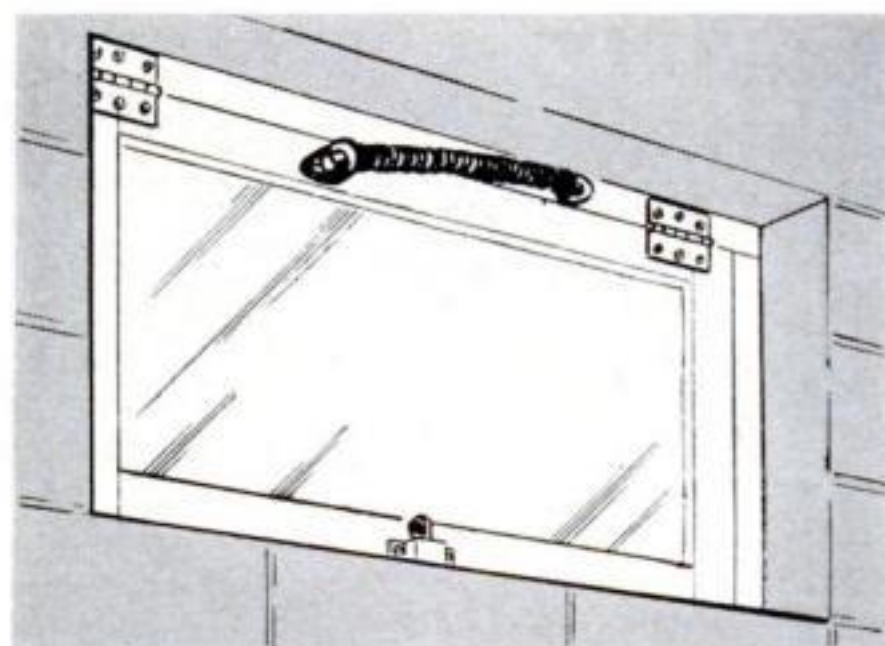
—Forest W. Stoll, Marshallville, Ohio.



Make Shelf Brackets by the Pair

NEXT time you need shelf brackets, make them two at a time from a square of scrap wood. Draw a diagonal line on the board's face and drill two 1"-diameter holes through it, centered on the line and spaced 2" in from a corner.

Then drill screw holes in the edge of the board, a pair for each hole in the face. Cut the board along the diagonal line and anchor the brackets with screws driven through the predrilled holes.

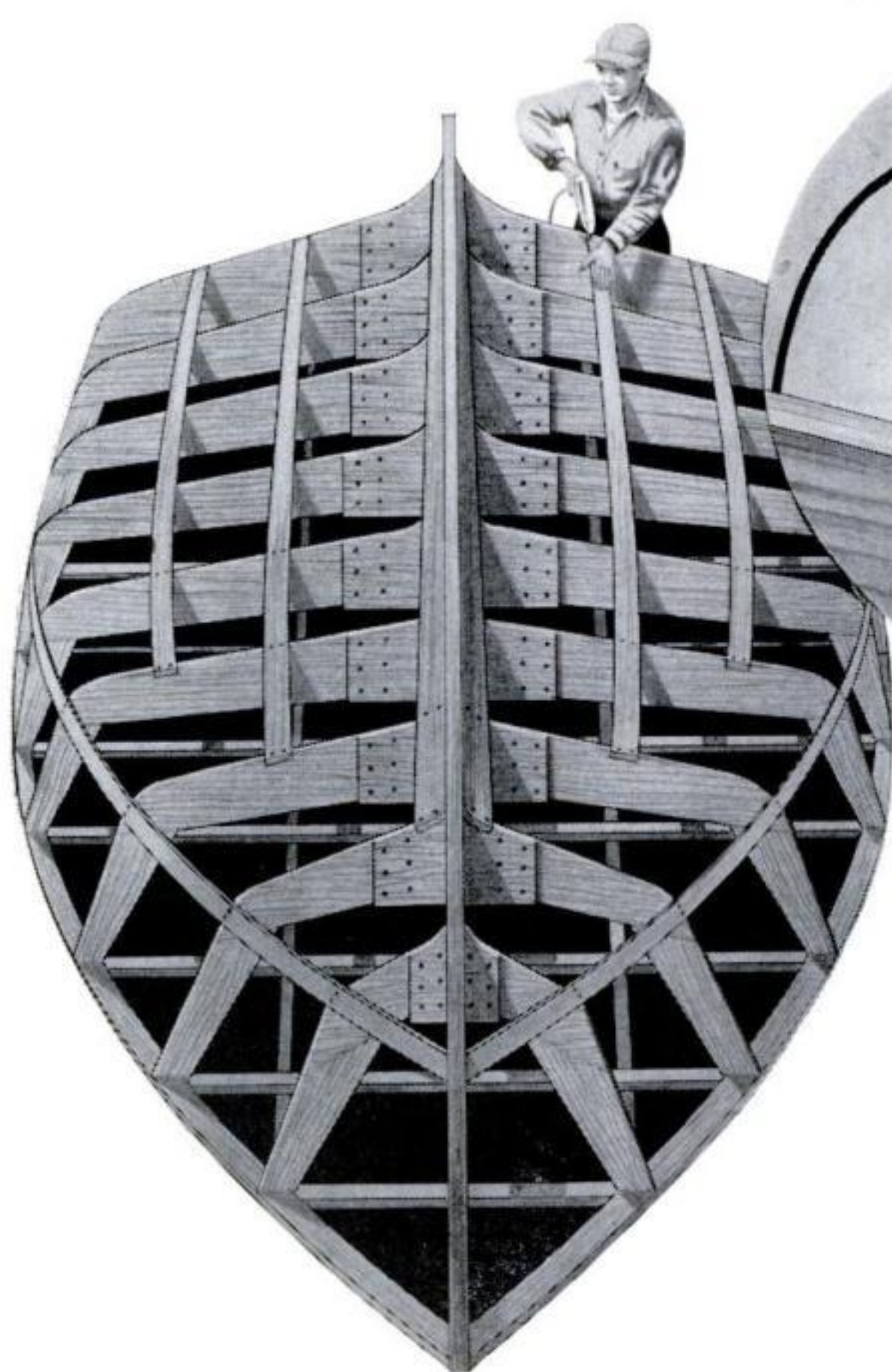


Taming Basement Windows

You can control those slamming transom-type basement windows with a spring used for closing screen doors. Mount it on the inside of each window, and wind it so its tension acts as a counterbalance to the window's weight. In this way, the spring will tend to open rather than close the window, making it easier to handle and incidentally avoiding the occasional mishap of having it slam shut.

—Andy Vena, Philadelphia, Pa.

Only a Screw holds like a Screw



Experienced craftsmen know that nothing can take the place of a screw for holding power. For every project in which permanence, quality and beauty is desired—be sure you have plenty of precision-made Southern Screws on hand.

Leading hardware or building supply dealers everywhere stock the Southern fastener line. In addition most boating supply stores carry Southern's line of non-corrosive screws . . . Including brass, Everdur silicon bronze, aluminum, stainless, chrome plated brass, and hot-galvanized steel. Check your supply of slotted and phillips screws now—and when you buy be sure to specify Southern. Buy 'em by the name—buy 'em by the box and save!



Southern
SCREW COMPANY
STATESVILLE • NORTH CAROLINA

WOOD SCREWS
TAPPING SCREWS
STOVE BOLTS
MACHINE SCREWS & NUTS
CARRIAGE BOLTS
HANGER BOLTS
DRIVE SCREWS
DOWEL SCREWS

Short Cuts and Tips

Make a Barbecue Double as Tea Cart

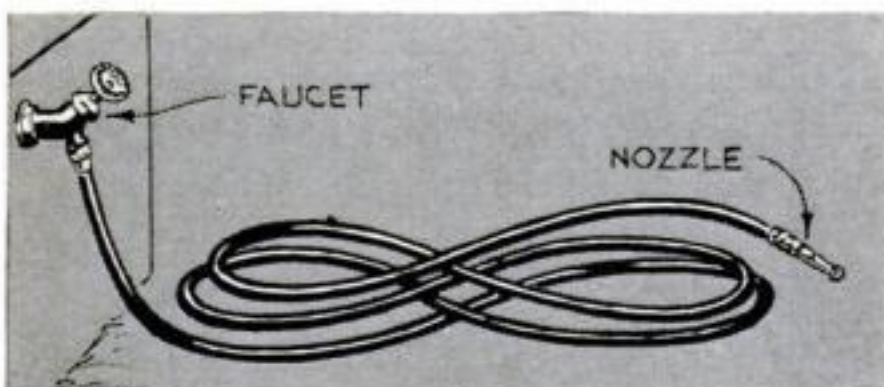
SHORT of storage space for my barbecue, I turned it into a mobile table for the living room. I removed the grate and set a plywood table top made for the purpose over the grill. My neighbors like the idea and have made the same winter-time conversion on their barbecues.—*Capt. Fred N. Ozment Jr., Fort Sill, Okla.*



▶▶▶ ON PICNICS and trips I cool our portable ice box with hot-water bottles. The rubber bags are filled with ice, made by freezing the water-filled bottles in the refrigerator. They don't leak, so food stays dry. On long trips I wrap each bottle in newspaper; the ice lasts longer that way.—*W. L. Hay, Morristown, Tenn.*

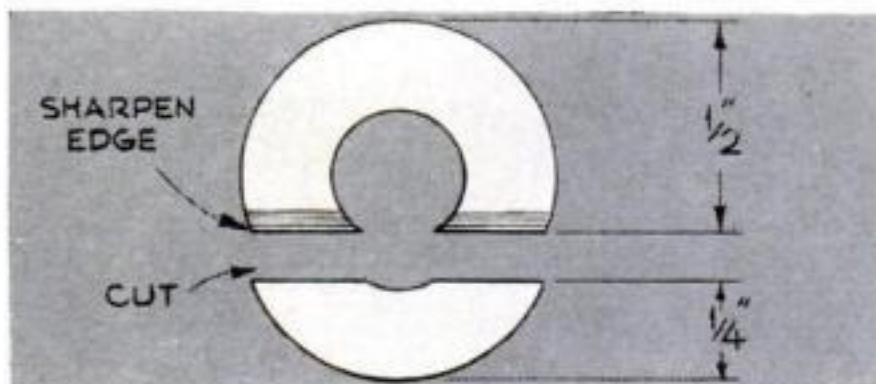
Hat Holder for the Car

A GOOD way to carry your hat in the car is to suspend it from the ceiling with rubber bands attached to drapery hooks. Each of the hat-holding straps consists of three rubber bands tied together.—*O. A. Nelson, Seattle.*



Coiled Hose Won't Kink

WHEN the garden hose is in frequent use, I coil it down between times in a figure-eight pattern. This prevents kinking and you'll find that it is an even faster method than winding the hose on a reel.—*Preston Stedman, Kingsville, Tex.*



Drawer Stop from a Washer

LOST the staple-shaped stops that keep cabinet drawers from dropping out on your toes? Make new ones from $\frac{3}{4}$ " O.D. washers and drive them into holes left in the front rails by the original stops.—*A. J. Field, San Francisco.*



All you need for Spring Spruce-up... all in one handy *MoPAR* kit...all for \$2.25*!

Special package price! For sparkling "new car" beauty, here's what you get in one easy-to-take-with-you, easy-to-use car care kit:

1. MoPar Automobile Polish. Fast-acting. Just apply, let dry, wipe clean.
2. MoPar Liquid Chrome Polish. Quickly removes tarnish, restores original brilliance.
3. MoPar Glass Cleaner. Spray on, wipe off. Leaves no streaks or blurs.
4. MoPar lint-free Polishing Cloth.

Pick up your kit today from your Plymouth, Dodge, De Soto, Chrysler or Imperial dealer, or independent repair shop featuring quality MoPar products. And while you're there, remember he's the man to see for *all* your car care needs. MoPar means genuine Chrysler Corporation products, made to highest quality standards.

MoPar Division, Chrysler Motors Corporation, Detroit 31, Michigan



** factory retail price, at factory*

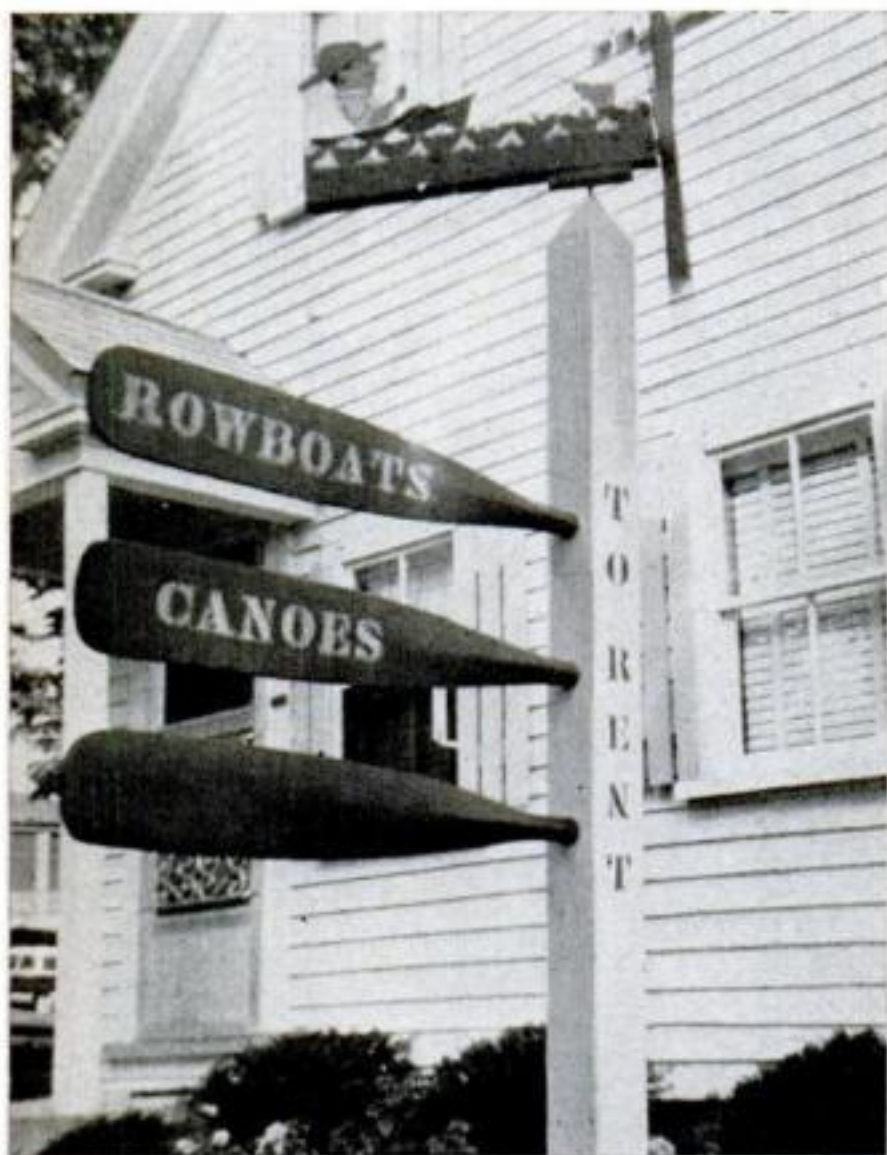
MoPAR
PARTS & ACCESSORIES

Short Cuts and Tips

.....

Candle Reflects from Tin Can

TIRED of carrying a heavy lantern on camping trips? Then split a tin can down the front and part way around the bottom. Bend the side pieces open and stick a candle inside, as shown at right.—*Michael O'Higgins, Arlington, Va.*



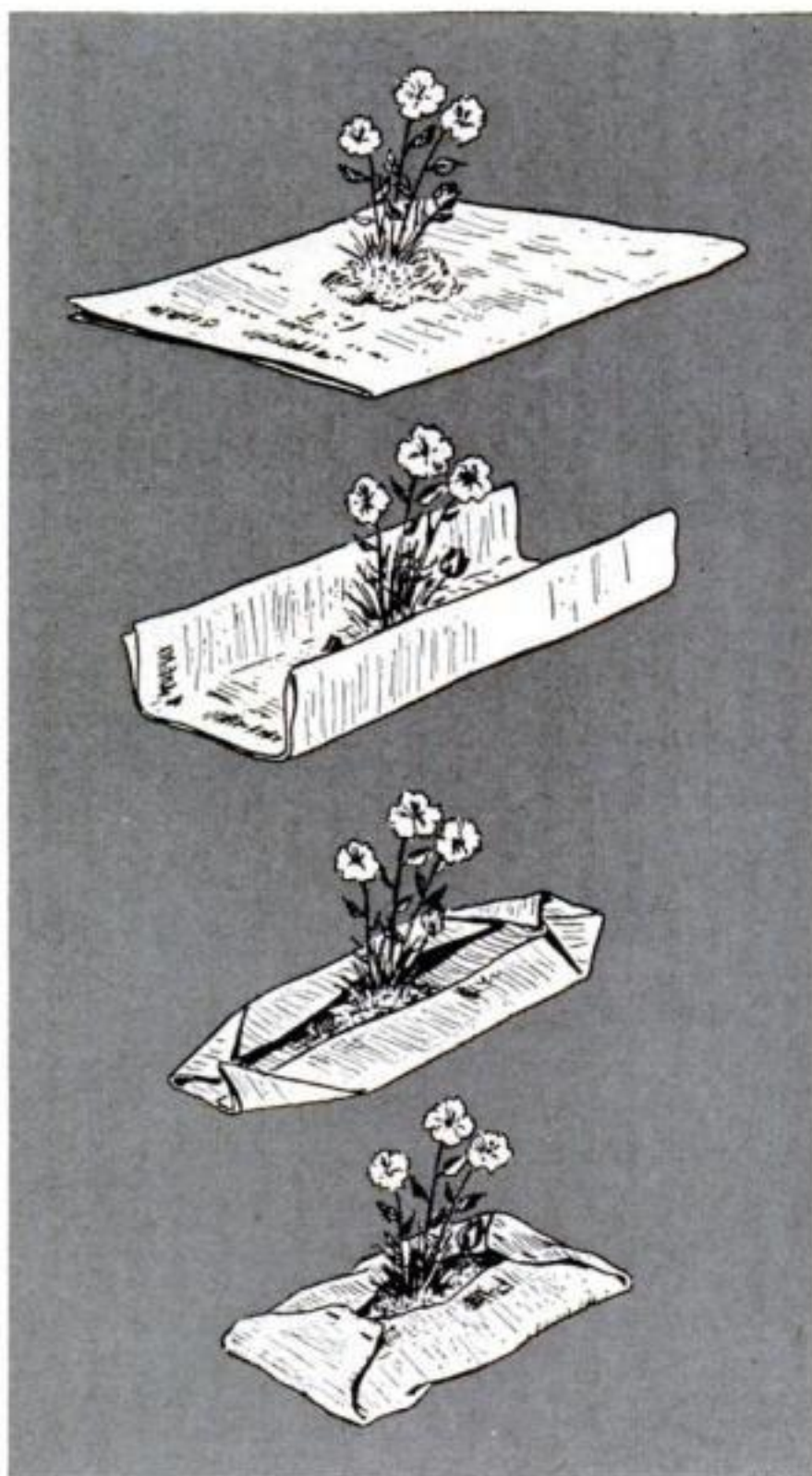
Signs Have a Nautical Flavor

DON'T throw away broken canoe paddles or oars. The blades can make salty signboards for your name or a business message.—*John Morgan, Holbrook, Mass.*

Moving Seedlings with Safety

SHIFTING small plants without losing the soil around the roots takes only some newspaper and a stapler. Fold two sheets of the paper in half and place the dug-up plants in the center. Then fold the paper around the roots, as shown, staple the ends, and replant the seedlings with the paper.—*Ralph Wilkes, Keuka Park, N. Y.*

▶▶▶ **I** REPAIR holes in window screens and in screen doors with a large needle and some stout thread. Sewing the patch on, I have found, is easier, and also makes a much neater job, than wiring it in place.—*Mrs. Monty Koslover, Watertown, Mass.*



it's easy...it's fast...it's professional
For a finer finish use

ADALOX®

The Champion of Sanding Papers



BOATS



CONSTRUCTION



HEMOCRAFT

**For disc...portable belt...oscillating...
 and hand sanding...metal or wood**

ADALOX gives you faster, finer finishes on any material...
 and it outlasts ordinary sandpapers. This rugged abrasive is
 the production tool of professionals and all industries.
 Use it on boats, construction, homecraft, furniture...
 in fact, any sanding job.

It always pays to use the best — ask for ADALOX.

Comes in HANDY PACK Sheets for hand or "shimmy" sanders,
 HANDY PACK Discs for portable grinders and drills, and in
 Belts for all popular belt sanders. See your hardware dealer,
 lumber yard, marine supply, or return coupon below.



FURNITURE



BEHR-MANNING CO.

TROY, N. Y.

A DIVISION OF NORTON COMPANY



Behr-Manning Products: Coated Abrasives • Pressure-Sensitive Tapes • Sharpening Stones
 Norton Products: Abrasives • Grinding Wheels • Grinding Machines • Refractories

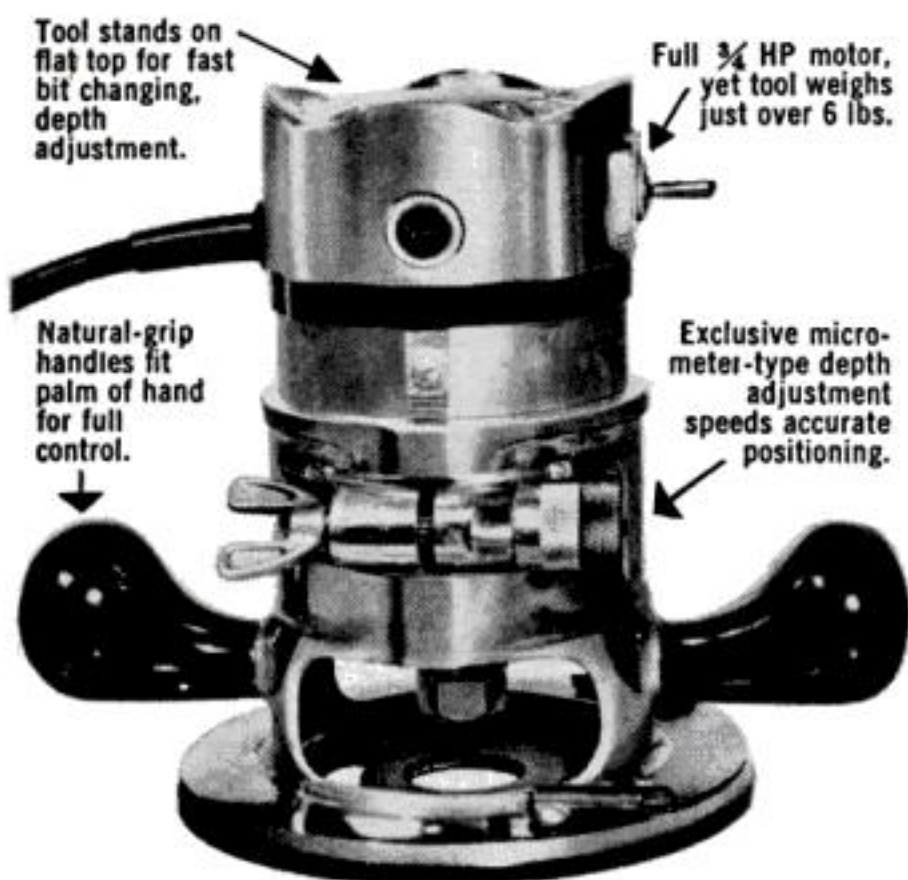
Behr-Manning Co., Dept. PS-258, Troy, N. Y.
 Please send me name of my nearest dealer
 for ADALOX sandpaper.

Name _____

Street _____

City _____ State _____

NEW BLACK & DECKER 3/4 H.P. HEAVY DUTY ROUTER GIVES YOU MORE



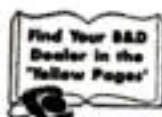
A maximum of power packed into a minimum of weight! That's the new Black & Decker Router . . . one of the lightest, most compact units on the market! And it's loaded with special features for faster, easier, more precise work. This is the *complete* woodworking tool, perfect for beading, grooving, routing, fluting, etc. Compare the power and performance of the new Black & Decker Router with **Only** any other. Then compare price **\$59⁵⁰** and you'll be sold!

...and new B&D Router Kit!



B&D ROUTER KIT gives you Router, six popular bits, Straight and Circular Guide in handy metal kit for only \$88.00 . . . Save \$5.75.

WRITE TODAY for new B&D Router Manual—loaded with project ideas, illustrations, professional tips. Send only 50c with name and address to: The Black & Decker Mfg. Co., Dept. SO48, Towson 4, Md. (In Canada: P. O. Box 278, Brockville, Ont.)



Look under "Tools-Electric"



World's Largest Maker of Electric Tools

We Took a Houseboat Vacation

[Continued from page 117]

river became home after a few days and we forgot the frantic pace of city living.

No special equipment was necessary. We took plenty of food for easily prepared meals. Along the river we picked up fresh sweet corn, tomatoes and cold watermelons to fill in. A charcoal burner made shore picnics easy. Two mattresses from roll-away beds made comfortable sleeping places for the children when spread out on the cabin floor.

River travel was new to me, as it was to my wife and three children, six, eight and 10 years old. Locking a boat through the many dams was a mystery at first. And we had to learn the simple rules of river traffic. Actually, becoming a river captain was a big part of the fun. I found satisfaction in docking the boat gently, navigating the locks like an old-timer and maneuvering safely among other boats.

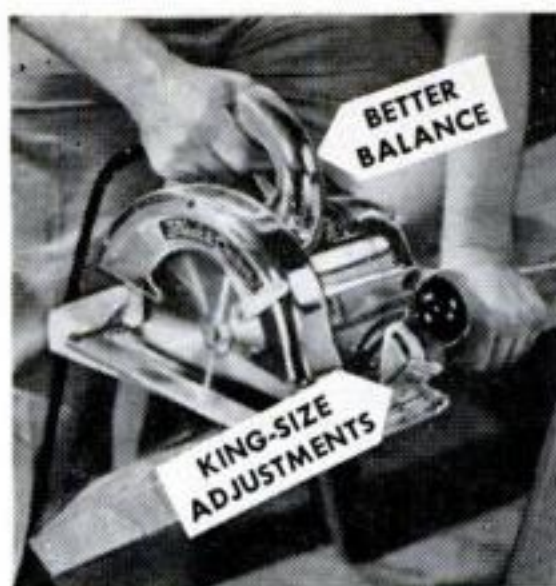
We laid out our route beforehand on a set of river charts bought from the Army's Corps of Engineers. Marked on the charts in great detail were channels, sand bars, buoys, dams and mileage markers. We found these road maps of the river worth much more than their \$3 cost.

Shoving off from home port at Mile 446, we headed down the Ohio River. The broad stream was alive with river craft, most of it commercial traffic. The children kept us busy with questions about tugs and barges. Six-year-old Steve, who enjoys a pun, entertained himself by yelling "Hi, boy" at every river buoy we passed.

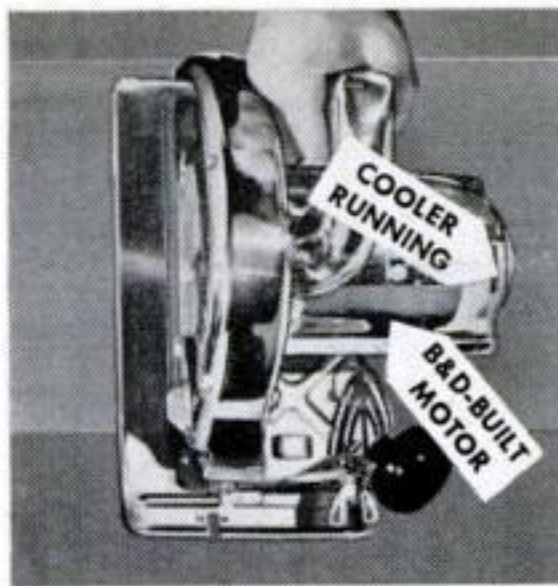
In a day and a half we had gone 100 miles, to Carrollton on the Kentucky side. Here we turned into the Kentucky River, one of America's most beautiful small waterways.

Deep and green, the Kentucky winds back into the hills between high cliffs. It has fine fishing and 10 ancient dams that are still hand-operated by "lock-masters." Sixty-five miles upriver we tied up at Boat Club Harbor and went ashore for a restaurant meal. A sightseeing trip to the state Capitol and the governor's mansion gave the children a needed change in routine.

Continuing on up the Kentucky we passed under high bridges, loafed by small farms and little crossroads villages. Well above Frankfort we turned into the



EASIER HANDLING—Lightness and balance, easy adjustments, safety features give the operator better control in the wood.

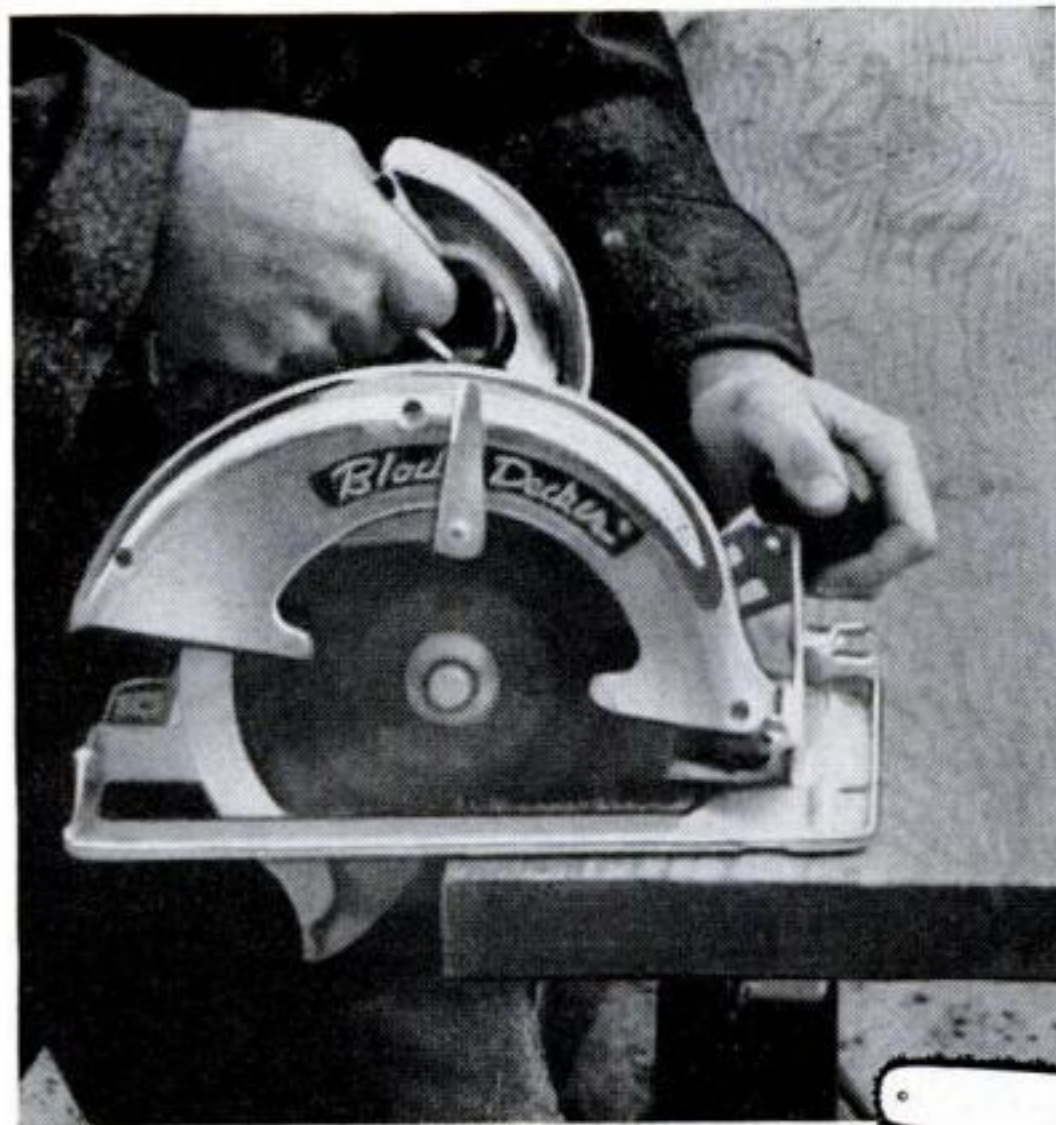


MORE POWER—Cool running B&D-built motor is custom engineered for abundant power on a variety of sawing jobs.



BETTER VISIBILITY—Black & Decker's exclusive picture-window view, double guide lines insure line-of-cut accuracy.

HERE'S WHY BLACK & DECKER SAWS ARE TOO TOUGH TO BEAT!



The features of a product establish its quality, performance, satisfaction! And the features of Black & Decker Saws assure you the fastest, easiest sawing you've ever done! Those same features enabled a B&D Saw to stand up to an independent laboratory's 7-Day Torture Test . . . to run continuously for one full week . . . to take more punishment than most saws ever get in a lifetime of use!

Try a B&D Saw at your dealer's now. Check its construction, heft it, pull the trigger and feel the surge of power. See for yourself why Black & Decker Saws give best performance, value, versatility.

NEW LOW PRICES
IN TIME FOR

SAWTIME '58

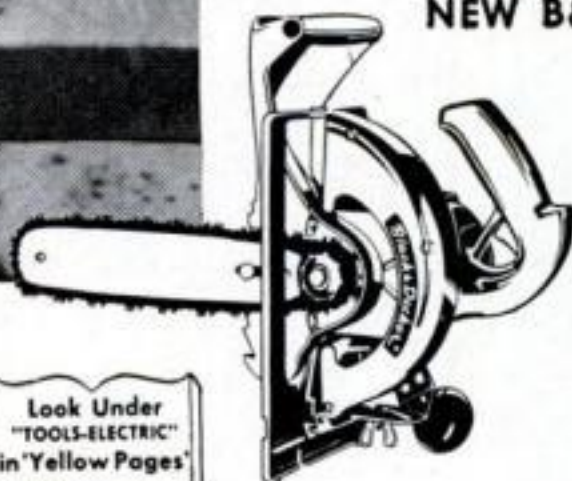
SEE YOUR B&D DEALER NOW!



Black & Decker®

Towson 4, Md. World's Largest Maker of Electric Tools

NEW B&D CHAIN SAW ATTACHMENT



Cuts trees, timber, beams, heavy planking, stacked lumber. Cuts any position—overhead, notching, etc. Heavyweight performance, maximum versatility . . . safe, fast. Fits B&D #73, #83 Saws.

This time she didn't need oil!



Most likely your wife wouldn't react this way. But if oil consumption has been a problem in your car, the results with Sealed Power's new stainless steel* oil ring have been so phenomenal she might be tempted. Even under high vacuum conditions such as deceleration, even when cylinder condition is poor, KromeX ring sets with this new oil ring deliver absolute oil control . . . immediately save you money you've been spending for oil.

UNIQUE FEATURES

This oil ring resists sludging and clogging because of the unique characteristics of stainless steel. And Sealed Power's stainless steel oil ring has chrome-plated steel side rails for more than double the life you'd expect. You can't do more for your car at less cost to yourself. Ask for Sealed Power.

FREE OFFER

If you're interested in how to maintain your car properly, write for our illustrated manual, "Care and Feeding of Engines." It's yours for the asking. You'll find its illustrated pages informative, helpful, crammed with tips which may save you money. For your free copy, write Sealed Power, Dept. H-4, Muskegon, Michigan.



*U. S. Pat. No. 2,789,872

Sealed Power

PISTON RINGS

BEST IN NEW CARS! • BEST IN OLD CARS!

We Took a Houseboat Vacation
mouth of the narrow, swift-flowing Dix River. This would be a short side trip to add spice to adventure.

I had heard that big rocks were hidden beneath the surface of this river and planned to go in only a short distance for a look at the rocky cliffs. The waters began to look more and more treacherous, so I started to wheel her about to head back for the Kentucky River.

I put pressure on the wheel and it whipped around crazily. The steering cables had pulled loose and the boat was

After the city, before the state, The zone keeps mail from being late

The Post Office has divided 106 cities into postal-delivery zones to speed mail delivery. Be sure to include zone number when writing to these cities; be sure to include your zone number in your return address—after the city, before the state.

drifting aimlessly in the narrow gorge. Using clutch and throttle I edged her into the bank and snubbed her to a stump. Before long I found the spot where the cable had slipped loose. I soon had her fixed again and learned an important lesson in the process: Always carry a set of tools for emergencies.

Back in the Kentucky again, we went a short distance farther up. Finally, 125 miles from the Ohio we turned around and headed for home. It was like a completely different trip back; seen from a different angle, the landscape had a new freshness and variety.

Our houseboat vacation cost us no more than an automobile trip of the same duration. Food and soft drinks cost \$50. Gasoline—we used a gallon an hour when underway—cost \$27. Incidentals like ice, souvenirs, fishing license and river charts added \$13. Totaling it all up, including \$160 for boat rental, we had spent \$250 on a 10-day vacation for five.

No boat dock had charged us for water. And on three nights we even made fast to boat docks for the night, with an invitation to plug into shore electricity, free.

We met some families who have pooled their resources to buy a houseboat for from \$2,000 to \$5,000. One boat was owned and jointly used by no less than three families!

END

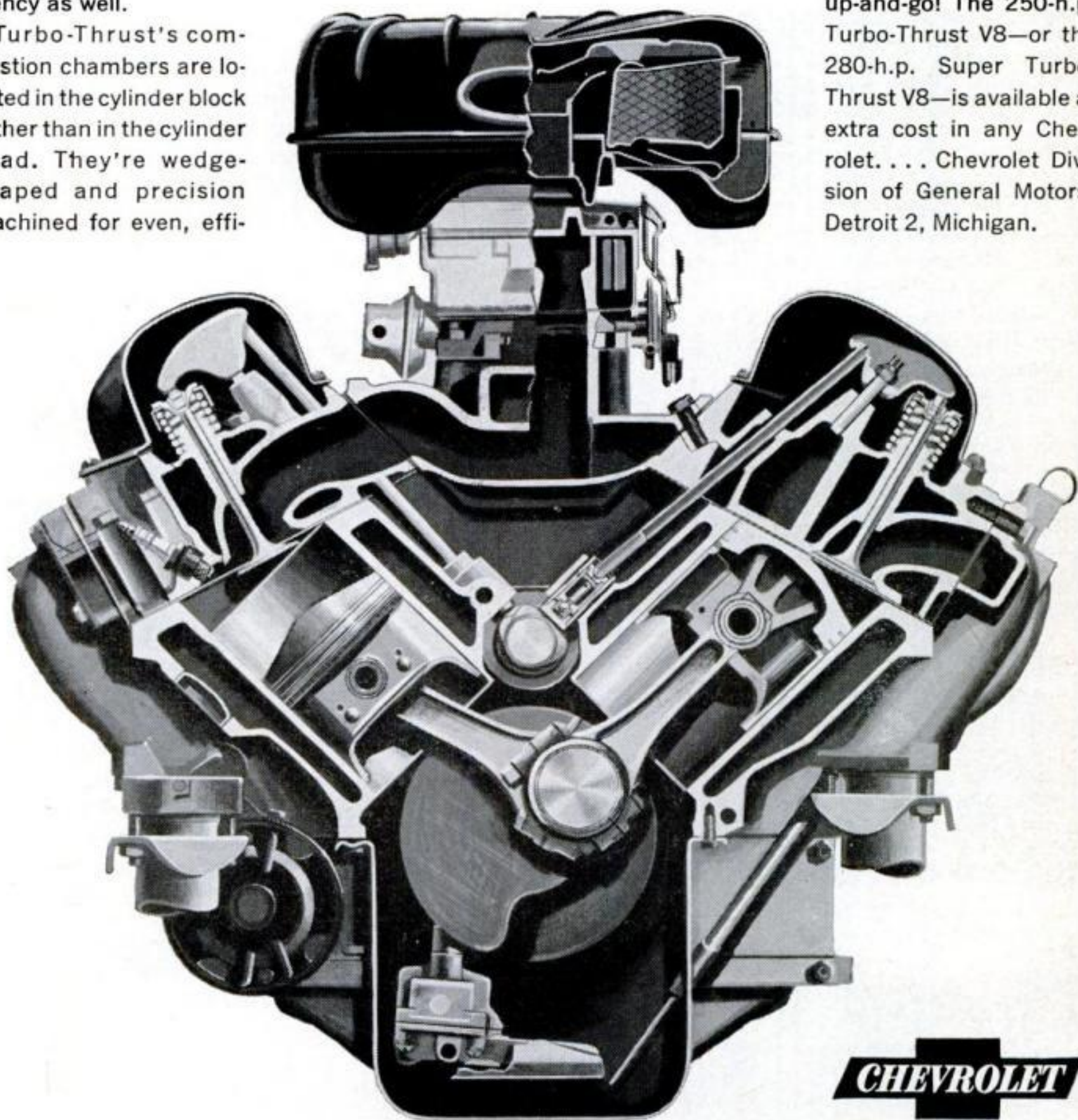
New in the way it looks . . . in the way it feels —Chevy's Turbo-Thrust V8!

Here's an engineering achievement you can feel the instant your toe touches the treadle. You feel a new kind of response—an ultra-smooth pickup. And when you lift that Chevrolet hood you'll see why. You'll see an engine so radical it even looks different. It's the Turbo-Thrust V8. It's built around a revolutionary design that contributes to constant smoothness at all engine speeds and to exceptional efficiency as well.

Turbo-Thrust's combustion chambers are located in the cylinder block rather than in the cylinder head. They're wedge-shaped and precision machined for even, effi-

cient combustion. Since each chamber is precisely the same size, each piston does the same work. The result is a velvet-smooth flow of power from idling speed right on up. A whopping 348 cubic inches of displacement gives you power when you need it—with plenty in reserve. Visit your Chevrolet dealer today. Lift the hood and see the difference . . . take a drive and you'll feel it!

Here's a new kind of get-up-and-go! The 250-h.p. Turbo-Thrust V8—or the 280-h.p. Super Turbo-Thrust V8—is available at extra cost in any Chevrolet. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.



Keep your rotary mower blade sharp all summer long for only **98¢**



Rotary Mower file by Nicholson lets you sharpen your blade easily. If your machine is engine-operated, disconnect the spark; if electric, unplug cord.

It's a nuisance to drag your rotary mower off to be sharpened several times a season. The grass doesn't stop growing while your machine is away from home. But a new product by Nicholson solves the problem. Our Rotary Mower file is the first tool ever designed specifically for sharpening rotary blades. Best news of all: it sells for only 98¢, and pays for itself the first time you use it.

The Nicholson or Black Diamond Rotary Mower file comes with a handy hang-up hole for easy storage in your shop or garage. And every file comes with its own protective plastic sheath.

Look for it in its colorful display. It's at your hardware dealer's now—the biggest tool bargain you ever came across.



NICHOLSON FILE COMPANY

Providence 1, R. I.

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)



NICHOLSON FILES
A FILE FOR EVERY PURPOSE

Bargain Boats Come in Kits

[Continued from page 154]

other highly valuable tool is a portable electric handsaw, which cuts both straight and curved lines, leaves smooth edges and makes shave cuts for precise fitting.

Selecting a motor. Pick the motor for your boat according to the job you want it to do. The kit manufacturer's data will tell you the power range you can use. For water skiing or aquaplaning, you'll usually need at least 15 horsepower.

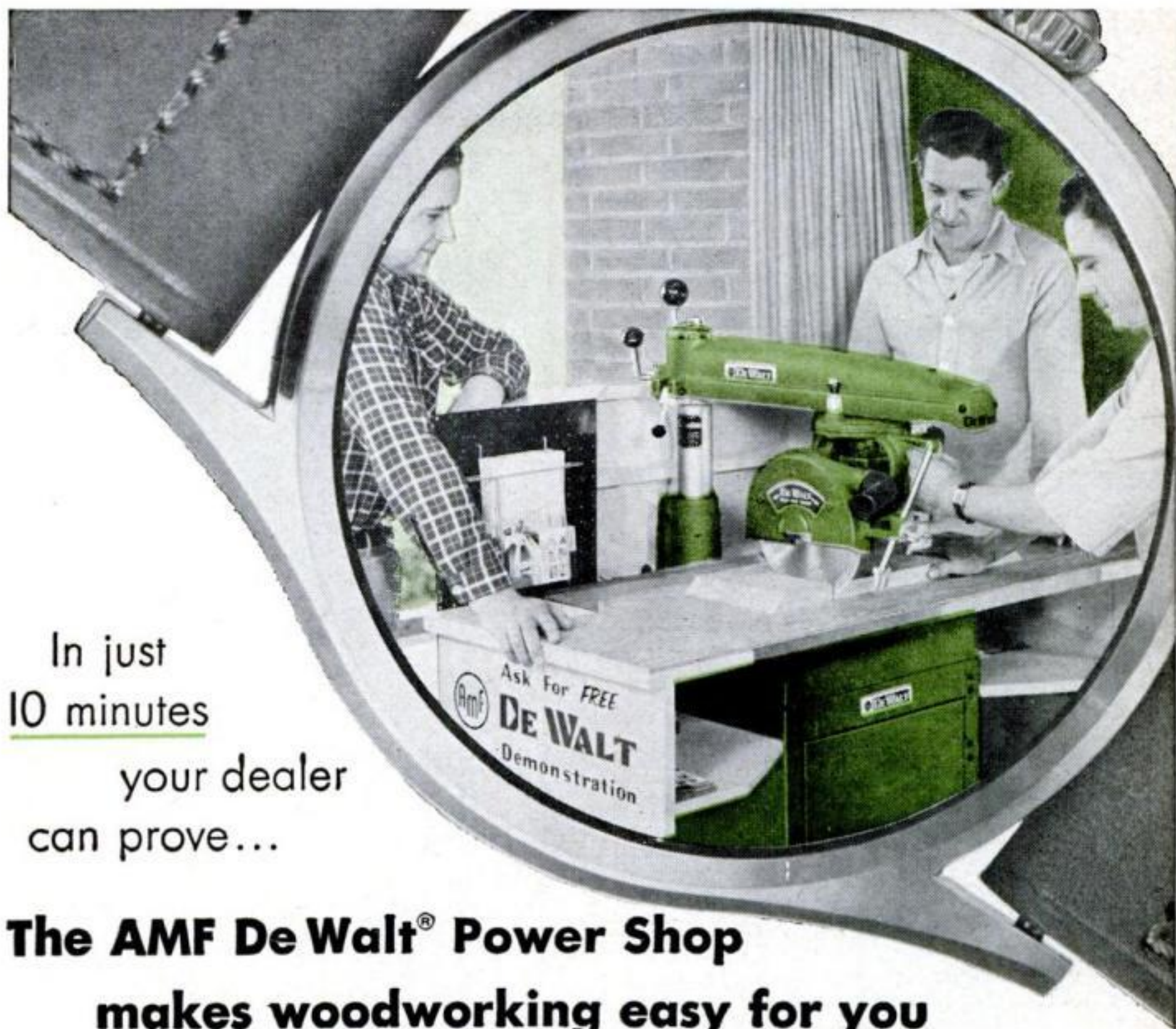
For general use, buy your motor on the basis of the speed you want with the load you'll carry. Lightly loaded (one or two people), a typical 14' runabout can do 15 m.p.h. on five hp., 23 m.p.h. on 10 hp., 28 m.p.h. on 16 hp., and around 40 m.p.h. on 25 to 40 hp. If you want fast performance with heavier loads, select a higher-powered motor within the range set by the manufacturer.

If you want just enough power for fishing, a small motor will cost less to buy and run, but don't go below the minimum set by the boat maker. With an undersized motor running at capacity, you'll get neither performance nor economy.

Where to build it. The old joke about not being able to get a boat out after it's built is not as far-fetched as it may sound. Merely measuring the width of a doorway is not enough. Make sure there's plenty of clearance to turn corners and navigate stairways.

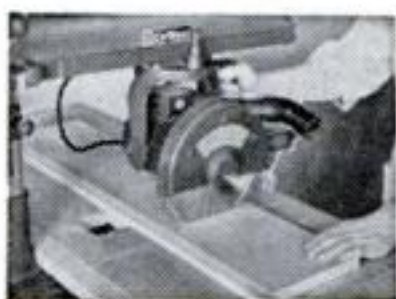
The garage is usually the best place to assemble a kit as it provides ample working space and wide doors. If the garage isn't heated and the weather is too cool for resin adhesives, the answer is a space heater. It need be used only during the period required for the resin to set properly. It is a good idea, however, to allow time for warming up the parts to be glued.

If your boat is small enough to fit a car-top carrier, you'll save the cost of a trailer, the license fee and the extra insurance that's usually required. Trailer prices range from about \$100, for small boats up to 14', to \$350 or more for larger runabouts and cruisers. Many kit makers also sell trailers suited to their own boats. If you leave your boat moored during the summer and need to transport it only in spring and fall, it's usually more economical in this case to rent a trailer. **END**



In just
10 minutes
your dealer
can prove...

The AMF DeWalt® Power Shop makes woodworking easy for you



SEE Safer, easier
top-side cutting



SEE Direct-drive power,
no belts, no pulleys



SEE DeWalt's exclusive
safety features



SEE Layout marks visible
every cut, no mistakes



SEE Work moves straight—
saves 75% floor space



SEE DeWalt becomes 12
professional tools in 1

See for yourself why DeWalt's original radial arm design, big capacity, and unsurpassed accuracy make it the finest, most valuable all-purpose power tool you can own.

Your dealer will quickly show you how a DeWalt saves the cost of a shop full of tools — makes all home woodworking fast, easy, safe... fun! How you can make furniture, build in cabinets, finish off the attic or basement, make home repairs... do all those things you've always wanted, *even if you've never used a power tool before!*

See your Franchised DeWalt Dealer for a Free, convincing demonstration today! Easi-Budget Terms — 10% down. 2 years to pay!

Owners! Send for valuable new DeWalt Woodworking Manual, just \$3.95 pp.

Send the coupon for free booklet and name of nearest DeWalt dealer.



DeWalt, Dept. PS-804 Lancaster, Pennsylvania
Division of AMERICAN MACHINE & FOUNDRY COMPANY



☐ Send FREE colorful 20-page Booklet and name of dealer.
☐ I enclose \$3.95 (check or m.o.) for DeWalt woodworking manual.

Name _____

Address _____

City _____ Zone _____ State _____

NEW! **Dish-Quik** REPLACES ANY THUMB-CONTROL SPRAY!

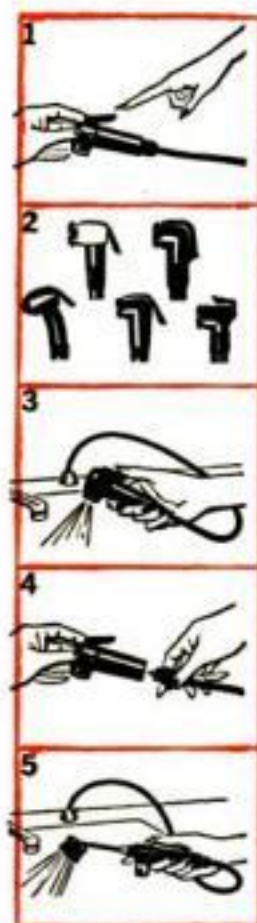
EASY TO INSTALL!



**ALL-PURPOSE SPRAY
SUDS, SCRUBS
and RINSES!**

ONLY \$9.95 fair trade
Deluxe Replacement Unit—
attaches to your existing hose

Dish-Quik makes quick work of dishes and a dozen other kitchen tasks! Even scrubs out the sink—yet your hands never touch hot, soapy water! To spray-rinse with hottest water, just press the thumb lever; or, tap the button for an instant flow of rich, foamy suds. Uses any good liquid detergent; holds two-day supply. Rugged, all-nylon brush gets dishes, pots and pans really clean! Fully guaranteed.



DO YOU HAVE A SPRAY THAT CAN BE REPLACED WITH DISH-QUIK?

1. The answer is "yes", if your spray has a thumb-control.
2. Almost all sink sprays have thumb controls. These sprays come in many shapes; are widely used, in nearly 20 million homes.
3. They are called "automatic sprays" because they spray automatically when the thumb control is pressed.
4. It's easy to replace any automatic spray with Dish-Quik. Simply unscrew the old spray.
5. Then attach Dish-Quik to the same hose.

Now it's easy to repair or replace any automatic (thumb-control) spray! Dish-Quik is one of the new, official replacements, standardized to replace any old or worn-out automatic spray. In addition to Dish-Quik, the deluxe replacement, you can also choose Rinse-Quik, the standard replacement, for rinsing only. Replacement hoses and accessories also available. If you do not have a thumb-control spray, you cannot use these replacements. You can, however, install a new kitchen faucet equipped with your choice of Dish-Quik or Rinse-Quik.

**Ask for Dish-Quik and Rinse-Quik
Wherever Plumbing Goods Are Sold**

MAIL COUPON TODAY FOR FREE BOOKLET

AUTOMATIC SPRAY SERVICE CENTER, Dept. 14
1700 East 58th Place, Los Angeles 1, Calif.

Please send free 16-page booklet telling how to repair and maintain automatic sprays and how to install new kitchen faucets that are equipped with these sprays.

NAME _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

Guide to '58 Power Mowers

[Continued from page 158]

the obvious need. They are coming, in 1959 most likely.

One approach is to wrap the engine inside a large shroud. One part of the enclosure serves as the silencer, another separate part as a muffler. Liberal use of rubber mounts prevents direct transmission of noise from engine to shroud, also helps quiet clanking of parts.

How to pick a good mower—any year. The chart lists the points to check.

The engine. Type (two-cycle or four-cycle) doesn't matter, but the other factors do. You want power and torque for the job. A bit of reserve is handy.

You'll notice that some makers put more money into shaft bearings (important to engine life) than others do. The same is true of mufflers (the bigger the better).

Oil-bath air cleaners are considered more effective than the dry type, but may be a nuisance on a rotary mower—the oil is likely to spill when you tip the mower for cleaning. Sears' top-of-the-line model has a self-cleaning dry type.

Cutting. A solid steel bar sharpened at the ends is practically standard. But a few makes (Jacobsen, Homko) have separate knives that can swivel back if they strike a rock. This helps protect the engine shaft—a part expensive to repair.

Close trimming at the side is very convenient because it lets you do a quick clean job along walks and fences. An ample range of cutting heights is good, too—you can mow lush spring grass close, dry summer grass high.

Body. Steel is the choice for strength. But aluminum is lighter, and can be as strong if it's thick enough. The size of the wheels, and the bearings in them, make a big difference in how hard you have to push. A staggered wheel arrangement helps keep the mower level on rough ground (some Lawn-Boy models add knee-action to one front wheel).

The mowers listed in the spec chart—they're the biggest-selling, nationally advertised brands—are only a few of the hundreds of makes on the market. Many of the others are just as good, and may be smart buys. Just be sure that the one you pick is a soundly designed, solidly built machine—and that you can get service for it.

END

The fun
never
ends



with a **Cushman®**
ROAD KING

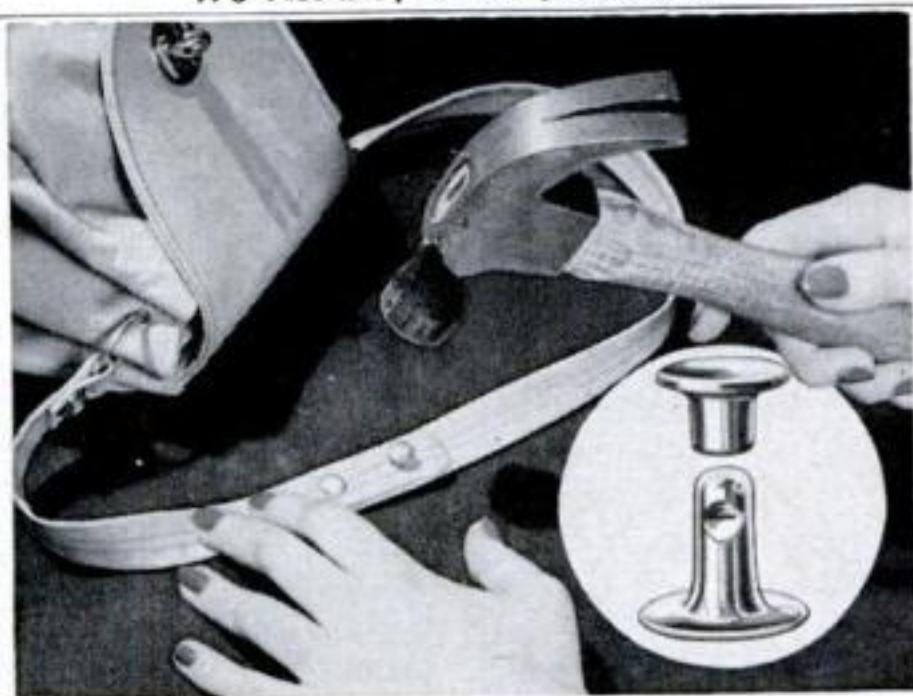
Worlds of fun and excitement wrapped up in this sleek package—the leader in its field. Sturdily built for safety and service... modernly designed in two-tone colors for sharp appearance. The famous Cushman Husky 4-cycle engine delivers up to 50 miles per hour, up to 100 miles per gallon.

SOLD AND SERVICED NATIONALLY
Replacement parts immediately available
Dealer inquiries invited

Ask your dealer for a **FREE demonstration ride**
Write for new **FREE Booklet today**

CUSHMAN MOTOR WORKS, INC.

A subsidiary of Outboard Marine Corporation
976 NO. 21st, LINCOLN, NEBRASKA



Repairs in a Jiffy
with **DOT SPEEDY RIVETS**

Literally hundreds of uses! Make or mend luggage, footwear, clothing, household utensils! Quick, easy fastening of cloth, leather, plastic, thin metals! A simple swat with a hammer does the trick. Speedy Rivets are available in 2 sizes. Only 15¢ per card. At hardware counters most everywhere.

Ideal for teen "hardware" belts!

look for the **DOT** on the package

COLUMBIA FASTENER CO.

3229 S. Ashland Ave., Chicago 8, Illinois
Subsidiary UNITED-CARR FASTENER Corporation



NEW Starrett No. 167
RADIUS GAGES



Now at NEW LOW PRICES!

No. S167C Radius Gage Set without Holder.....\$10.35

No. S167C Radius Gage Set with Holder..... 12.00

No. S167CH with 1/64 in. Gage and with Holder. 13.55

See Your Starrett Distributor

MECHANICS, MACHINISTS, INSPECTORS... here's why you'll go big for these new Starrett No. 167 Radius Gages:

Stainless steel with no-glare satin finish — to make them rustproof and stainproof, easy on the eyes in any light. *Individual gages* — easier to use, less chance of errors. *Five gaging surfaces on each* — to handle any concave or convex radii. *Sizes from 1/64" to 1/2"* — in your choice of six convenient sets. Available with handy gage holder.

BIG NEW CATALOG—FREE

Describes and illustrates over 3000 Starrett Tools. Send the coupon.



STARRETT TOOLS are carried by leading Industrial Supply Distributors and Hardware Tool Stores.

THE L. S. STARRETT COMPANY
Dept. PS, Athol, Mass., U. S. A.

Please send my free copy of the big new Starrett Catalog No. 27.

Name.....

Occupation.....

Address.....

City.....Zone...State.....



CASITE gives your car

NEW PEP NEW POWER

Frees sticky rings and valves

Get increased pick-up and improved engine performance! Casite—the “tune-up in a can”—through the air intake or added to gasoline, restores split-second valve timing and full compression.

Prevents hydraulic lifter trouble

Casite keeps valve lifters clean and free-working. Just put a pint in the crankcase every 1,000 miles, and with every oil change.

Assures safe, smooth break-in

New and rebuilt engines wear-in smoothly and safely with Casite in the oil. Penetrates tight spots—eliminates overheating, scoring.

Cuts start-up wear

Speeds oil flow—protects closely-fitted parts during warm-up periods. Almost doubles engine life.

Gets rid of sludge and gum

Casite removes gum and goo—KEEPS the engine clean—increases power, improves performance, saves gas and repairs, too.

Results guaranteed, or double-your-money-back!

Get Casite at your service station, garage or accessory store.



HASTINGS MFG. CO., HASTINGS, MICH.
Piston Rings, Oil Filters, Spark Plugs

Tomorrow's Tires

[Continued from page 122]

the Michelin-X resists the usual tire's tendency to ripple and distort as it revolves. Michelin says this gives two to three times conventional-tire mileage. Few critics dispute the claim.

Most other claims made for or against the tire, though, are in dispute. European users are enthusiastic about its steering response, stability, skid resistance, low squeal, comfortable ride.

But American experts found that X-tires are too bouncy for their taste; while they absorb big bumps well, they fight little ones. It is said, too, that the wire-cord tires are hard to steer, have a tendency to wander, that their stability is uncertain. Because of their flatfootedness, they normally corner wonderfully well, but if they are pushed too hard on a curve they may skid out suddenly, without warning.

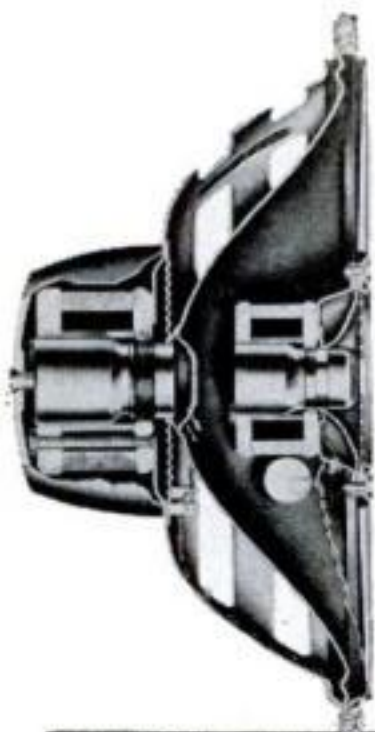
Which is right? Considering the differences between European and American car suspensions, both findings could be. Whether X-type tires can be matched to the softer-riding designs favored on this side of the Atlantic is a moot point. Several of the largest American companies have taken out licenses under Michelin patents. They insist, though, that their planning now stops at truck tires. The most optimistic estimates place wire-cord passenger tires four to five years away.

Meanwhile, tire researchers are looking about for other cord materials. Dacron and glass fibers, potentially, could increase body strength. But at present one has poor heat resistance and the other low flex life.

Laboratories are also trying to improve nylon and rayon cords. The main object is to obtain a higher ratio of strength to bulk in the interests of cooler-running tires.

This is all part of a growing concern for high-speed safety and is related to a potentially ominous fact: Most cars can now run faster than their tires—and too many of them do.

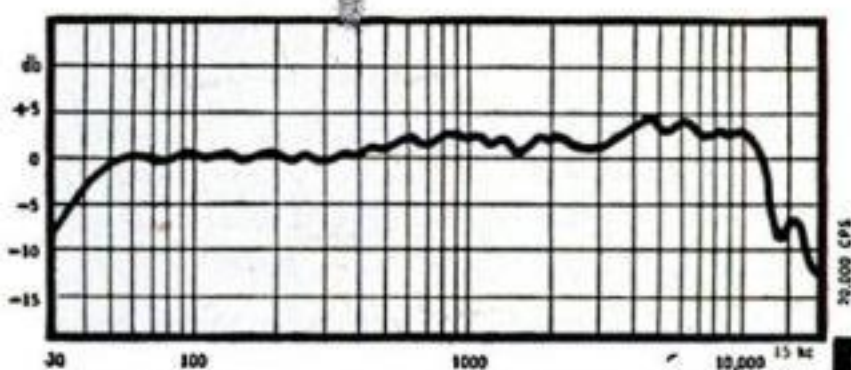
Tire failure at high speed takes several forms, all dangerous. Standing waves cause distortions in the tread and body that can make a tire wobble violently and throw a car out of control. Centrifugal force may tear off the tread. Or heat



**no finer speaker
at the price!**

General Electric 12" Golden Coax

Model A1-401



Relative frequency response in infinite wall baffle
—critical damping at resonance.

In one dual speaker unit, the G-E Golden Coax provides complete audio frequency response from 40 to 15,000 cycles (see curve). It combines a 12 $\frac{3}{8}$ -inch woofer, 2 $\frac{3}{4}$ -inch tweeter and a built-in crossover network. With a high frequency dispersion angle of 100 degrees in all directions and power-handling ability of 25 watts, the Golden Coax is truly an outstanding high fidelity value. Hear it at your dealer's or mail coupon for complete details.



General Electric Company, Specialty Electronic Components Dept.,
Section HF, West Genesee Street, Auburn, N. Y. PS4

Please send me the full story on General Electric High Fidelity speakers.

Name _____
Address _____
City _____ Zone _____ State _____

GENERAL ELECTRIC

How to make your cabinets more convenient



Hide-A-Shelf hardware by Amerock stores appliances, small power tools, radios, and similar items out of sight in your cabinets and easily raises them to desk height or counter height when needed. Easy to install . . . accommodates any width shelf . . . fits any cabinet with inside height of 22 $\frac{1}{2}$ " or more. Adjusts to counterbalance 6 to 30 lb.



Easy-to-install Amerock Turn-A-Shelf hardware eliminates groping in dark, hard-to-reach corner cabinets. Use for both full-round or corner-type revolving shelves. Economical three-piece pivot hardware . . . beautiful Copper-Glo steel shelves . . . reversible shelf brackets for wooden shelves . . . and sturdy center posts.

You can see Hide-A-Shelf and Turn-A-Shelf working models at your AMEROCK hardware dealer or lumber dealer.



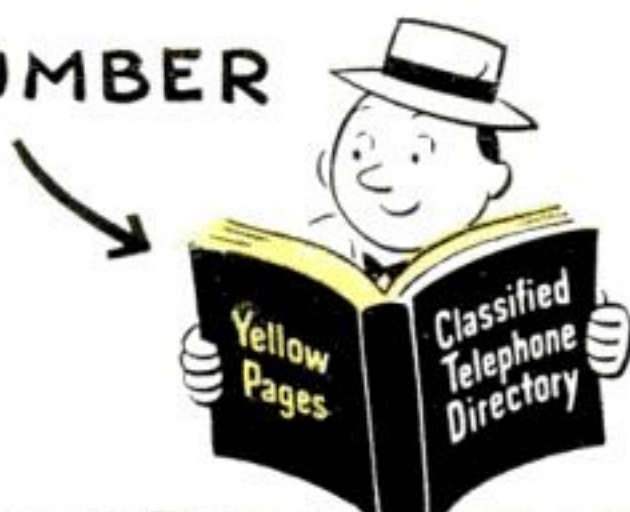
Recommended for use in Home Improvement
Council Remodeling Contest

Write name and address below, send to
AMEROCK Corp., Box PS84, Rockford, Illinois

Looking for Something?



LUMBER



lumber, plastics, grinding wheel,
paint, insurance, roofers, steel—
whatever you need—



**Advertisers displaying this emblem
make your shopping easy.**

Tomorrow's Tires

and pressure may separate the plies, especially in tubeless tires that give hot air less chance of escape.

Because these and other forms of tire failure have been increasing (particularly in the South and Midwest), rubber companies have started to build special "high-speed tires." By this summer, all major producers and probably some smaller ones will be marketing premium lines designed for speeds in excess of 130 m.p.h.

And a definite swing to nylon cords in run-of-the-mill tires can also be foreseen. Some tire men predict that nylon will be used exclusively within two years, though this may reflect more wishful thinking than actual belief.

Rubber companies would naturally like such a development because it would simplify production and inventory while favoring their more expensive lines. But technicians also insist that nylon's strength—and the strange fact that it shrinks when hot—makes it a safer tire fabric for the speed and temperature conditions that are becoming commonplace.

Nylon's main stopper is that it does more for a tire than it does for a car. It's noisier than rayon and squeals more on curves and, because of a tendency to "grow," tires wear faster. Nylon tires also take a "set"—that is, develop small flat spots when left standing. Though these spots quickly run themselves out, car makers have so far refused to demonstrate their new models on tires that thump noisily for a couple of miles.

Some experts think nylon's weaknesses can be overcome, while others feel that stronger rayon cords—plus better rubber adhesives—hold out a brighter hope. But whatever the future brings, there's little chance that the maximum of safety, comfort, style, economy, and sales appeal can ever be combined in a single tire.

Yet while compromise is inevitable, some new materials and designs may make possible a different kind of compromise in which advances along one front do not result in retreats along another. Lab men are confident that tomorrow's tires will overcome recent losses in tread life while holding—or even making some gains in—riding comfort.

But above all, future tires must be made safer for the turnpike speeds we'll all be hitting in the years ahead. **END**

Faster, safer way to wash your car



Du Pont Car Wash gets your car so clean it drains dry, without *wiping*. Unlike ordinary detergents, it's safe for wax and it doesn't streak! At service stations and auto supply stores— $\frac{1}{2}$ -lb. can only 75¢.



BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY



DU PONT CAR WASH

Makes paint removing a cinch!

Don't spoil a repaint job by painting over a cracked or peeling finish. It's so easy to remove it with Wonder-Paste. This famous remover is *different*! Finish comes off in one easy scraping—not coat by coat.

Quickly applied with a paint brush. Does not run on upright surfaces. Remains moist and active, even outdoors.
At paint and hardware stores

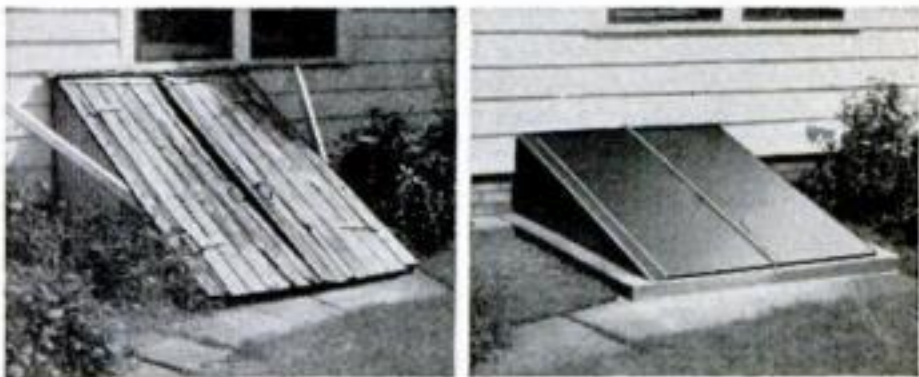


Over 6 million
cans sold—
it must be good

- Send 25¢ for illustrated Manual on Refinishing
Or write for free Wonder-Paste folder.
Wilson-Imperial Co., 121 Chestnut St., Newark 5, N. J.

WONDER-PASTE Remover

TROUBLESOME WOOD HATCHWAY?



REPLACE IT!

With a modern Bilco Basement Door.
All-steel, weathertight, spring-operated.
Do it yourself in just 3 to 4 hours.



AMERICA'S FINEST
BASEMENT DOOR

Write today for
FREE illustrated
replacement folder.

THE BILCO CO., Dept. 119
NEW HAVEN 5, CONN.

Please send me complete information.

NAME
ADDRESS
CITY STATE

No other power tool offers you
so **MUCH** for so little

DYNO-MITE POWER WORKSHOP



Start with the
No. 888
POWER TOOL
3 Tools in 1
• $\frac{3}{8}$ " Drill
• 6" Disc Sander
• 6" Polisher

1/3 h.p.

ONLY
\$44.95

**THEN ADD THESE ATTACHMENTS TO
MAKE A COMPLETE POWER WORKSHOP**



FREE FOLDERS!

Ask for them at your
hardware dealer's or
write:



MILLERS FALLS CO., Dept. PS-24, Greenfield, Mass.

Driving an Auto-Pilot Car

[Continued from page 107]

Pilot turned on than with it off. The reason appears to be this:

Suppose you are traveling on a main Louisiana or Texas highway, with little or no traffic. You find, operating the accelerator by foot, that you stabilize at about 65 m.p.h. indicated as your preferred fast cruising speed. Watch closely, though, and you'll see that that speed is not quite uniform, and that the variations are intentional. Depending on what can be seen a half-mile ahead, on road surface, side winds, vibration, grades and many other factors, you modulate that preferred fast cruising speed over a range of perhaps four or five miles an hour. You drive, in other words, about as fast as you think proper under the circumstances—and the circumstances keep subtly changing.

Now suppose you latch the robot at 65 m.p.h. on the same road. In the circumstances where it's the right speed or just a little slow, you don't mind. In those where it's just a little fast, you soon become vaguely uneasy. So you reach forward and twist the knob back a little.

On our trip, automatic running was consistently a little slower than conventional running. This reduction seems all to the good: It pays dividends in relaxation and improved gas mileage, and, being held with machinelike steadiness, doesn't depress average speeds.

Passing and night driving. These are, of course, the most technically demanding parts of highway travel. As might be expected, you usually want no part of the robot during a high-speed pass; it's simply not suited to those critical moments when you hang behind a car or truck, stealing glances and calculating whether or not you have a passing chance. In all our 4,000 miles we made only three automatic-control passes, each with miles-long visibility.

At night on narrow roads the Auto-Pilot also has limitations. Partly this is because your reading of what is at the far fringes of the high beam is shaky and fast-changing. And partly it is because your right foot hankers to modulate speed as headlights come toward you. (Notice what that foot does the next time you meet High-beam Harry on an 18-foot highway.) But both the passing and nighttime limitations disappear on di-

STOP FAN DRAG!

with the NEW
FAN-O-MATIC
MODEL 200

Automatic FAN RELEASE

Makes fan a free-wheeling unit
at speeds over 35 MPH*

INCREASES

- Available Horsepower up to 20 H.P. at cruising speeds.
- Gas Mileage up to 3 miles per gallon . . . by actual road tests.
- Acceleration up to 10% . . . in official tests conducted at Indianapolis Speedway by U. S. Auto Club.

REDUCES

- Engine Noise, Vibration for smoother, quieter riding.

Simple to install. Adaptable to most cars
Installation instructions with every unit

*Easily adjustable to higher or lower speeds

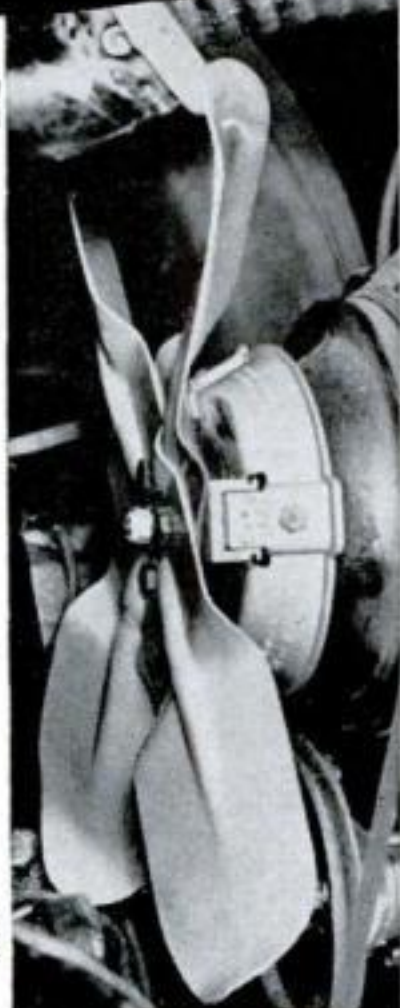


AVAILABLE at Auto Dealers, Garages, Service Stations
Manufactured and Guaranteed by

Radiator Specialty Co., Charlotte, N. C.

In Canada: Radiator Specialty Co., Ltd., Toronto

• 2189



pull the trigger... spray paint

7 times faster than brushing!



Speedy Sprayer

ONLY
\$32.00
less motor

Paints anything from a house to a toy. Saves its cost on the first major job! Speedy Sprayer does in minutes what brushing takes hours. Finish is smooth, flawless. Uses any 1/4 h.p. motor with 1/2" shaft. No. 780 Outfit—10 ft. air hose, tire chuck, quart gun, less motor, only \$32.00. Every workshop should have it. At leading stores.

Free! Write for "How To Spray" Booklet and folder.

W. R. BROWN CORPORATION

Specialists in Portable Paint Sprayers for Over 37 Years
2637 N. NORMANDY AVENUE, CHICAGO 35, ILL.

FIVE FEET OUT but the **LUFKIN** doesn't buckle



3/4" Super Mezurali®

Here's how professionals rate a steel tape rule. They make this buckling test before they buy . . . and so should you.

Do it, and you'll join the "pros" who insist on Lufkin quality—yet you'll pay no more for it. Because Lufkin is the quality tape rule at a popular price.

You'll find dozens of uses for it in your house and workshop. Look for the yellow and green box at your hardware store.

THE **LUFKIN**
RULE COMPANY
TAPES • RULES • PRECISION TOOLS

Special TRADE-IN OFFER

Now get

\$1.00

trade-in allowance
for your old torch*
toward this modern

BERNZ O MATIC®

All-purpose
PROPANE TORCH KIT



Regular retail price.....\$8.88
LESS YOUR TRADE-IN... 1.00



now
you pay **\$7.88**
only

*Any old torch—Gasoline, Butane,
Kerosene, "Tin-Can" Type, Al-
cohol, Propane—regardless of
age or condition.

Bernz-O-Matic
Torch with pencil
burner unit

Utility
burner head

Flame
Spreader

Soldering
Tip

Here's the kit you'll use hun-
dreds of times—for home and
auto repairs, thawing
frozen pipes, hobbies, start-
ing charcoal fires, laying
asphalt tile, electrical work
etc. Torch lights with flick
of a match. Burns clean
without soot. Plenty of
heat. Up to 2300°F! Safe,
disposable fuel cylinder.

NO OLD TORCH?

YOU can still get a \$1.00 allow-
ance if you clip this ad and bring
it to your local dealer. He'll
give you this \$8.88 all-purpose
torch kit for only \$7.88!

(See pages 58-59 H.I.C. \$125,000 Contest)

Otto Bernz Co., Inc., Rochester, N. Y.

Driving an Auto-Pilot Car

vided highways, especially limited-access ones. Here, if traffic is not too heavy and the weather is good, you are usually eager to let the robot do its job.

Is it really safe? The answer isn't simple, for there are at least three separate factors involved:

1. It certainly promotes safety by reducing fatigue. At the end of a 600-mile day you are noticeably fresher than you would be with a conventional accelerator. This is not solely because you are spared the leg cramps and stiffness that come from having your right leg constantly committed. It is also because you simply have less work to do.

2. Its design is moderately but not absolutely "fail-safe." A sticking contact could theoretically open the throttle. This wouldn't necessarily mean disaster, short of shifting to neutral, for the brake switch could still kill the latching circuit. But it would certainly startle and alarm you.

3. It does not invite highway hypnosis. The explanation for this lies in your past

.....
Next Month: The lowdown on tune-ups—how to tell when your car needs one, what to expect when you get one. See May PS for the answers to all your questions, in "What Is a Tune-Up?"

.....
driving experience. You lend the Auto-Pilot a duty you have been trained to perform yourself, and this somehow makes you just a little uneasy. It is not an entirely relaxing thing to sit back at 70 m.p.h. and feel the engine get gas from some other agency than yourself; your alertness is more likely to be heightened than lulled. This slight wariness stays with you as long as the device is working, even after thousands of miles have been logged.

Does it make sense? For intercity driving, turnpike travel, and long trips generally, the Auto-Pilot is a genuine help. On curvy or mountain roads, downtown, or in heavy traffic anywhere, you will find less use for it. (Though still some: The speed-minder function is handy anywhere, and could save you some speeding tickets.)

That, then, is the little robot: busy, often precise, sometimes a little stupid, and very useful.—*Frank Rowsome Jr.*

WAR SURPLUS AND OTHER **BAIGAINS** **SAVE** UP TO **90%**

FAMOUS NAVY MK14 AIR COMPRESSOR

Great for tree, termite, airbrush & paint spraying; filling tires, aquariums, etc. Dual & remote control electric receptacles, 115v 60 cycle AC, heavy duty HP. Westinghouse Motor. Direct drive. Water & explosion-proof. Built-in air filter, adjustable pressure setting up to 47 lbs. Built-in pressure gauge. Self-contained switch. Mounting brackets. These units made under license of Sperry Gyroscope Co. Wt. 66 lbs. gross. Approx. GOVT. COST \$585. Like NEW. \$21.95.

With portable steel hand cart (shown), rubber wheels, specially constructed for mounting this unit. Incl. 25' rubber air hose, 6' extension cord with plug & fittings. Wt. 76 lbs. Complete with cart—\$26.95. With new internal-pressure spray gun with 3 adjustable spray tips, 1 qt. cap. \$35.95 complete.

ARC WELDER KIT—\$26.00 Build your own complete make-up package incl. 1 Aircraft DC Gen. 200 Amps. 24 V; Rheostat, Toggle Switch, 1 Ammeter, Electrode Holder, Welder's Shield, Voltage Reg. Simple instruction wiring diagram. Wt. under 100 lbs. Approx. GOVT. COST \$475. Like new, perfect. All units guaranteed pre-tested. \$26.

BUILD YOUR OWN ARC WELDER, LIGHT PLANT OR BATTERY CHARGER \$37.50

Kit incl. 1 Navy NEA-5 Gen. combination AC-DC type. AC 115 V. DC 24 V., 200-300 Amps. 2 complete generators in 1, yet no larger than reg. gen. Ideal for home, shop and farm lighting plants. Delivers 1200 Watts AC. DC side for charging batteries, welding and operating war surplus motors. Also in kit: 2 Voltage Regs., AC & DC, Reverse Current Relay, 1 Ammeter, Rheostat, Electrode Holder, Toggle Switch, Welder's Shield, Wiring Diagram for kit. Wt. under 100 lbs. Approx. GOVT. COST \$650. Kit—\$37.50. Navy NEA-5 Gen. as above, purchased separately, \$23.50.

R1 GENERATOR KIT Jack & Heintz or GE. Rated 300 Amps. 24-32 V. With same items as above. Approx. GOVT. COST \$600. Complete 60 lb. kit—\$38.

BENDIX GEROTOR PUMP & MOTOR

Use wherever fluid pumping required. Excellent for hydraulic installations. Has 3/4" pipe connections, built-in relief valve adjustable up to 1500 lbs. Max. cap. 6 GPM. 1 1/2 H.P., 24 V. motor. Use on 12 to 36 V. Approx. GOVT. COST \$350. NEW. \$10.95.

HEAVY-DUTY RHEOSTAT Ideal for regulating voltage on electric welders. Rated 5.75 Ohms, 100 Watts with double windings & dual female 25 amp., 125 V. receptacles. 7" hi x 5 1/4" D. Shpg. wt. 2 1/2 lbs. Approx. GOVT. COST \$25. Brand New. \$2.25 ppd.

MICROMETERS Black crackle finish frame. Easy-to-read graduations in .001. NEW. 0-1" cap. \$2.69 ppd. 1-2" cap. \$3.79 ppd.



EXPLOSIVE RIVET & BLOW TORCH KIT

Contains 300 assorted Dupont Explosive Rivets, 1 set of 9 fractional drills, 1 Butane Blow Torch with extra cartridge—everything needed for blind riveting. Torch can also be used for precision soldering, brazing, etc. 3500° pinpoint flame. Approx. GOVT. COST on rivets alone. \$90. Complete kit \$5.95 ppd.



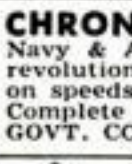
DUPONT EXPLOSIVE RIVETS

Essential wherever blind riveting required. 1/8", 5/32", 3/16". Round & flat heads. Approx. GOVT. COST 32c ea. 1,000 assorted for only \$5.00 ppd.



ELECTRIC PUMP WITH CONTROL UNIT

Runs on 12 or 24 V. Centrifugal type. Pumps 500 GPH. Complete with on and off switch rheostat, 2 speeds (hi & lo). Mfd. by Ingersoll-Rand. Shpg. Wt. 7 lbs. Approx. GOVT. COST \$195. NEW. \$8.95.



CHRONOMETRIC TACHOMETER

Built to U.S. Navy & Air Force specs. Standard brand. For counting revolutions per min. for any rotating shaft. Can be used on speeds up to 10,000 RPM. Accuracy to 1/10 of 1%. Complete with male & female tips & shock-proof case. GOVT. COST \$87.50. NEW. Only \$19.95 ppd.



140-1 REDUCTION GEAR

For beaching boats, winches, hoists. Ideal for motor in golf or boy's electric car. Built-in (removable) DC motor & clutch. Hi torque, 10 speed. Runs on 6-12 or 24 V. Wt. 65 lbs. gross. Approximate GOVT. COST \$300. Like NEW. \$12.00. Matched splined gear for above—\$3.00 ea.

*225-1 REDUCTION GEAR—\$13.50.



WOOD PROPELLER

Genuine rock maple radio drone "prop." perfect for den, trophy room, boy's room. Smooth, highly varnished, 30" tip to tip. Clock, barometer or photo can be inserted easily into center (mounting holes provided). Can use to operate ice sleds, etc. Approx. GOVT. COST \$57. NEW. \$4.95 ppd.



B-16 KOLLSMAN AIRCRAFT COMPASS

Ideal for boats, cars, etc. Grad. in 5° increments. Liquid-filled. Lighted. Poly-plane compensator. Panel mounting. 3 1/8" dia. face; 4 1/2" deep. Checked & tested in our own lab. Approx. GOVT. COST \$150. Like NEW. \$12.95 ppd.



ASTRO COMPASS MARK II

Used by USAF & commercial airlines. Makes pelorus & azimuth circle for air or marine navigators. Great for astronomers. Incl. carrying case. Tested for accuracy in our own lab. Approx. GOVT. COST \$400. Now \$10.95.

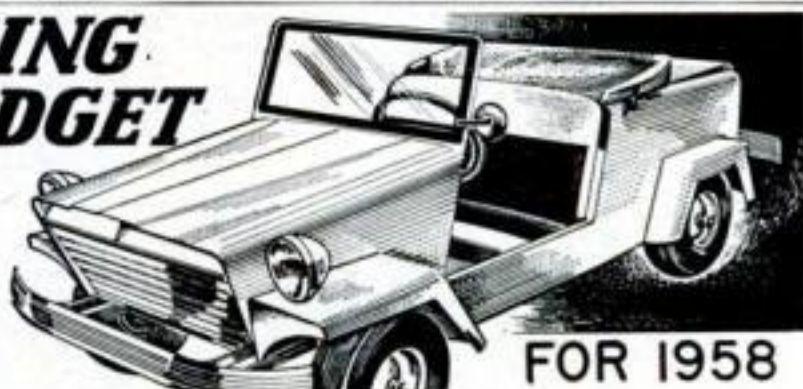


NEW! TERRIFIC! 1958 CATALOG!

Thousands of bargains in war surplus & other items. Hundreds of pictures. Send 25c for your copy today! Ppd. prices in USA only. Other prices FOB Culver City, Calif. Send cash, check or money order. 50% deposit on COD.

AIRBORNE SALES CO., INC. DEPT. PS458
8501 Stellar Drive, Culver City, Calif.

KING MIDGET



FOR 1958

More power, beautiful styling. New Features. Still World's Lowest Priced Car. Drive it for 75c a week. Rider agents wanted. Earn your own car. If no dealer near you send 25c for 32 page picture book with full details and dealer price. Or send \$1 (refunded first order) for this and Service Manual, plus Repair Manual, plus 15 5x7 photos of car and factory.

MIDGET MOTORS CORPORATION, Athens, Ohio



The Modern PLASTIC for lasting Home Repairs

PERMANENTLY mends cracks or holes in wood, tile, stone or plaster. Sticks and stays put—Does not chip, shrink or fall out. Easy to use. Economical. Mold it, chisel it, polish or paint it. The big 4-lb. can is obtainable from your lumber, paint or hardware dealer at \$1.40; or will be shipped direct postpaid (in U. S.) for \$1.75. Complete satisfaction guaranteed or your money refunded. Order now.

DONALD DURHAM CO.

Box 804-U Des Moines, Iowa

Cadillac

**SLEEK, SWIFT
AND MIGHTY SAFE!**



More fun on the water, less work out of water—that's the Cadillac story for '58. Plenty of room for friends and fishing gear. Light but mighty seaworthy. The

perfect answer to all-'round water fun. H.P. ratings up to 75. Write for free folder on Cadillac aluminum, molded plywood and ply-lap* models.

*Pat. Pend.

CADILLAC MARINE & BOAT COMPANY • Cadillac, Michigan

APRIL 1958 251



Start with a JBL D130—your basic loudspeaker. In no other high fidelity component is precision more important. The D130 is an unquestioned masterpiece of precision, without equal in advanced engineering, meticulous craftsmanship, and accurate reproduction. The JBL D130 is the only 15" extended range loudspeaker made with a 4" voice coil. When the D130 is used alone, this makes for crisp, clean bass; smooth, extended highs. Later, when you advance to the ultimate excellence of a JBL two-way system, add a JBL high frequency unit and dividing network. Then your JBL D130 will serve as a perfectly matched, beautifully balanced low frequency driver.



BUILD YOUR OWN ACOUSTICAL ENCLOSURE

An engineered, solidly built acoustical enclosure is required for satisfactory bass reproduction. You can build your own for your D130... build it to stand alone, build it into a wall or closet, or to fit inside some prized chest or cabinet.

Send for this free booklet which tells how to build a bass reflex enclosure of the size you require.



JAMES B. LANSING SOUND, INC.
3249 Casitas Ave., Los Angeles 39, Calif.

Send free Reflex Construction Folder and Catalog.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

TV's New Trick: Hidden Commercials

[Continued from page 97]

and a square—were used. In the other, gasoline trade names were used.

After the audiences had seen the films, they were asked to tell whether they liked, felt indifferent to, or disliked each movie. They were then shown the symbols and the trade names and asked to give their reactions to them. The results suggested that the way people had reacted to the symbols and trade names influenced the way they reacted to the movies. If they felt "positive" toward the preconscious information, they liked the movie; if they felt "negative" about the information, they objected to the movie.

The Precon inventors feel this point, then, is amply proved: Our preconscious likes and dislikes are the same as our conscious ones. Nobody, they contend, is going to convince us by Precon TV to buy something we don't want to buy, or do something we don't want to do.

Corrigan and Becker began their experiments with Precon apparatus with the thought that the technique would be wonderfully useful in education (training films) and psychotherapy (reaching the consciously withdrawn patient by tapping him on the subconscious). They still are ardently convinced of this.

The commercial possibilities occurred to them later. Already the inventors, through the newly created Precon Process & Equipment Corp. of New Orleans, have marketed a counter-top or window-display electrical device for flashing Precon advertising at passersby who think they are merely looking at an attractive illuminated color photograph. There is a strong likelihood that there'll be Precon movies, too.

Dr. Corrigan is convinced that if emotion-charged words suitable to the action of a movie are included in the film but are not consciously visible to its audience, the movie will gain in impact. Prof. Becker says the trick can be turned by superimposing the words on a master print of the film, but that a better way would be to synchronize a special Precon movie projector with each theater projector. A leading motion-picture studio has indicated seriously that it would like to be shown how a Precon movie could be made. And a wag has already suggested what to call it—a "feelie."

END



Wash off old paint with water!

Amazing how easy it is to use this miracle new WASH-AWAY Paint Remover. Just brush it on . . . wait a few minutes . . . wash off with water — your surface is clean, ready to refinish. Ideal for removing old finish from delicate antiques. Fine for outside use . . . siding, shutters, porches, boats. No scraping! Nonflammable!

AT SHERWIN-WILLIAMS DEALERS EVERYWHERE!

listed in yellow pages of phone directories

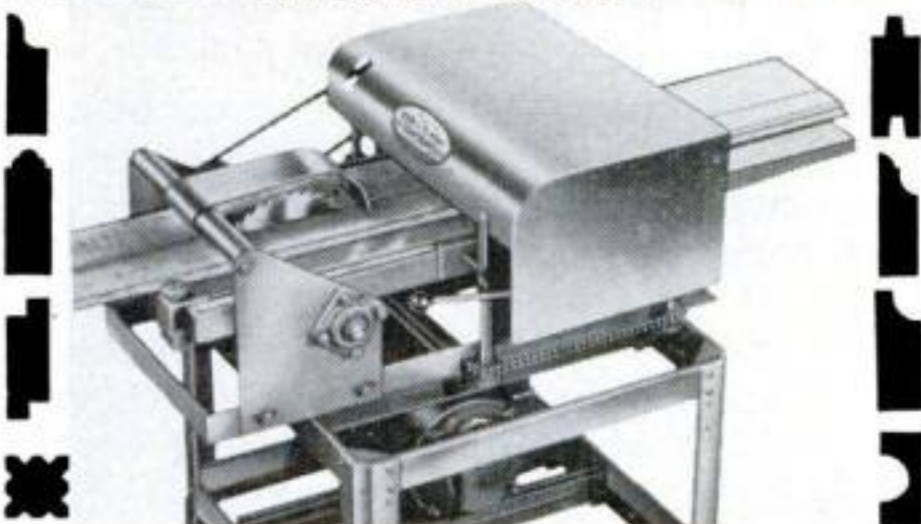
SAWS

PLANES

MOLDS



NEW BELSAW MULTI-DUTY POWER TOOL



Now you can use this ONE power-feed shop to turn rough lumber into high-value moldings, trim, flooring, furniture . . . ALL popular patterns.

RIP... PLANE... MOLD...

separately or all at once by power-feed . . . with a one horsepower motor. Use 3 to 5 HP for high speed commercial output.

**FULLY SAFE - GUARDED,
anti - kickback design.**

Low Cost . . . You can own this money-making power tool for only \$30.00 down payment.

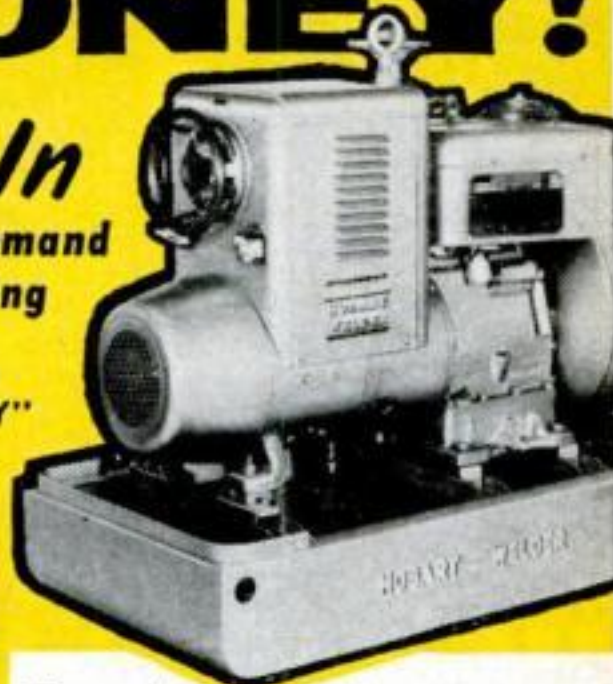
Write TODAY for free Catalog

BELSAW POWER TOOLS • 928 Field Bldg., Kansas City 11, Mo.

arc welding Pays Big MONEY!

Cash In
on the big demand
for arc welding

200 Ampere
"HUSKY BOY"



AC Transformer
Shop Type Welder



AC Welder
AC Power
Combination

Every day more and more opportunities for big profits arise in arc welding. Why not cash in, especially when it's so easy to do—with a low cost, high efficiency Hobart welder. Any one of these easy-to-use models puts you in business immediately.

200 amp. "HUSKY BOY" welds anywhere. Light, rugged, compact—easily mounts on your tractor or trailer to go to those emergency repair jobs. Portable mountings also available.

AC TRANSFORMER is a popular model for small shops, auto service shops, plumbing and heating contractors, farm welding, etc. Economical to operate, yet has big industrial model features.

AC WELDER/AC POWER 200 amp. combination furnishes current for welding and power for running tools, lights, etc. Simply connect it to your own power source or to portable gas engine. WELDING LESSONS BOOK, 200 pages, fully illustrated. Self teaching, \$1.00

HOBART BROS. CO., BOX P-48, TROY, OHIO, FE. 2-1223
"One of the world's largest builders of arc welding equipment"

"BUILD-YOUR-OWN" GAS DRIVE WELDER



Save \$200 to \$300 using this Hobart DC Welding Generator that gives you the opportunity to build your own efficient portable gasoline driven arc welder, at low cost.

These generators come equipped with all the features that are standard with Hobart factory-built engine driven models. Write for free booklet—"How To Build Your Own Arc Welder"

Some typical
home-built
welders



HOBART BROTHERS CO., Box P-48, TROY, OHIO, U.S.A.
Please rush me complete information on:

- | | |
|---|---|
| <input type="checkbox"/> "Husky Boy" | <input type="checkbox"/> AC Welder/AC Power |
| <input type="checkbox"/> AC Transformer | <input type="checkbox"/> Build-Your-Own |
| <input type="checkbox"/> Send Welding Lessons Book. I enclose \$1.00. | |
| <input type="checkbox"/> Booklet—"How To Build Your Own Arc Welder" | |

Name _____

Address _____

City _____ State _____

TOP VALUE SPECIALS!

SURPLUS ITEMS AT FRACTION OF ORIGINAL GOV'T. COST

OUR SPRING SPECIAL

OBERDORFER BRONZE

CENTRIFUGAL PUMP



ITEM #481

For: Fluid Transfer, Sprinkler Boost, Circulating, Marine Coolant

Designed for continuous, heavy service. Carbon bearings require no lubrication. For direct or belt-drive with speeds up to 3450 RPM. All bronze housing and impeller with $\frac{1}{2}$ " stainless steel shaft. Has $\frac{3}{4}$ " inlet and outlet.

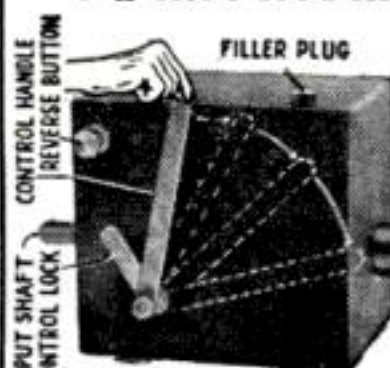
With $\frac{1}{4}$ H.P. Motor delivers—Gallons Per Minute, Head in Feet

R.P.M.	0	4	6	8	12	16	20
@ 1750	3.00	2.00	1.25				
@ 3450	7.25	6.75	6.50	6.25	6.00	5.25	4.25

Regularly \$26.50 OUR SPECIAL 12.50 Ppd. SPRING OFFER, ONLY 2 for 23.00

1½ H.P. HYDRAULIC SPEED REDUCER

with FINGERTIP CONTROL



USE FOR: • Reamer Drives • Midget Cars • Feed Mills • Canning Machines • Conveyors • Lathes • Milling Machines • Motor Boats • Cream Separators • Garden Tractors • Pumps

Variable output speeds from 0 to input speed available by moving control handle. Locking handle maintains setting. Use input power of $\frac{1}{4}$ to 1½ H.P. Shafts $\frac{5}{8}$ " diam. Input rotation counter-clockwise facing shaft. Input speed 750 R.P.M. $7\frac{1}{2}$ " x $7\frac{1}{2}$ " x $11\frac{1}{2}$ ". Output rotation reversible. Shipg. wt. 31 lbs. Complete with 2 qts. of oil and full instructions. F.O.B. Chicago.....

72.50

37-PIECE METAL STAMPING SET

STAMPS NAMES, NUMBERS, ON WOOD OR METAL

ITEM #390-B—FULL ALPHABET, A-Z, NUMBERS 1-9, "&", AND PERIOD. PRECISION HAND TRIMMED, deep cut, hardened TOOL STEEL STAMPS—IN FITTED EASY ACCESS CARTON. Made to rigid U.S. Army specifications.

Only \$5.50 per Set

2 for \$10.00 Ppd.



1 H.P. 12 VOLT ELECTRIC MOTOR



ITEM #308 — • For electric wheel chairs (Pop. Mech. design—Mar. 1953).

• For electric golf carts.

• For self-propelled scooters, children's midget cars.

Rated 1 H.P.—100 amps., 5600 R.P.M., 12 volts, D.C.—This double

shaft motor of ball-bearing construction may be run on 6 volts for lower horsepower requirements—Standard $\frac{5}{8}$ " shafts, flange mountings.—Dimensions: 9" x $4\frac{1}{2}$ " x $4\frac{1}{2}$ ". Ship wt. 19 lbs. A real value at 12.50 F.O.B. Chicago

2 H.P. ELECTRIC MOTOR

ITEM #315—24 Volts, 90 Amps., 4000 RPM, Spline shaft both ends. Style similar to above, Mfgd. by Hobart or Diehl, F.O.B. Chicago..... 13.00

FREE! NEW SUMMER 1958 CATALOG

60 VALUE-PACKED PAGES of unsurpassed War Surplus and newly manufactured Equipment. Bargains for farm, home, factory, workshop. Write letter today.

Order Direct from Ad. Send Payment Or Purchase Order Today For Phone Orders Call WEBSTER 9-3793

GROBAN SUPPLY CO. Dept. PS-4

1139 S. WABASH AVE., CHICAGO 5, ILL.

Our 5,000-Mile Missile Is Ready Now

[Continued from page 114]

In many a test flight out over the dark blue sea southeast of Florida, a Snark's guidance system has steered the missile around a rectangular course covering a couple of thousand miles, and brought it back to its base. There, with the aid of parabrakes and special belly and wingtip skids, it was safely landed by radio command, ready for more tests.

This is the way some military analysts see the Snark's strategic role:

- With their enormous range, Snarks could reach all potential enemy targets from bases entirely within U. S. territory. Furthermore, those bases could be rapidly shifted. In contrast, IRBM bases must be located mostly in foreign countries, where they will be vulnerable to political hazards; and can't be moved.

- In the event of a surprise enemy strike at fixed U. S. air and missile bases, Snarks could launch a retaliatory attack within minutes from bases whose positions could never be precisely known to the enemy, since they can be quickly and repeatedly changed.

- The Snark's guidance system is so accurate that it can be depended on to steer the missiles to so-called "hard" targets (dams, railroad yards, factories) as well as "soft" ones (sprawling air and naval bases, large cities).

- Enemy defense against Snarks would be both very difficult and costly.

- A mass attack of Snarks would be a most effective prelude to an attack by our long-range manned bombers. The Snarks could carry hydrogen warheads triggered to explode at ground level, so that even if the missiles were knocked out in the air, the bombs would not explode till they hit the earth, where they would do devastating damage.

Such an attack could be launched with no loss to our Air Force personnel; and at a cost approximately 1/30 as high as that of an attack by a comparable number of manned heavy bombers, fueled by a fleet of aerial tankers, which Snarks don't require.

Then, if the Snarks were to be followed by waves of B-52s, the men in those big bombers would have the advantage that the enemy ahead had already been badly battered, and there were great holes in his defenses.

END

SPRAY

Professional results
everytime with
PRESSURE QUEEN
the only 4 cyl.
portable
air compressor



PAINT

Non-pulsating, continuous air flow for fine finishes...
spraying house or barn... fast... easy... sprays paint
undiluted, 4-5 times faster than brush—better too!

Write for details and name of your nearest dealer.



The Campbell-Hausfeld Co.
151 Railroad Ave., Harrison, Ohio

CAMPBELL-HAUSFELD

WELD **BRAZE**
SOLDER **CUT**



4WAY
ONLY
\$14.75
f.o.b. factory

WELDER
Complete with
Twin Carbon Arc
Torch and ac-
cessories... to
handle all metal-
craft work.

Acclaimed by thousands of
Homeowners, Mechanics and
Hobbyists as the welder of
1001 uses. Easily operated
from properly wired 110 volt
AC or DC line. The ideal gift
with a life-long use... Order
today on 10 day money back guarantee.

FOUR-WAY WELDER CO., Dept. F3-D
1810 S. Federal St. • Chicago 16, Ill.

Sharpen YOUR SAWS with QUICK-WAY*



Now you can sharpen, joint, gum and
retoothe all circular saws to 12" dia. Pre-
cision results. Safety Guide, Mounting Block
and Grinding Wheel included. Model PG-12
\$19.95 Postage Paid. Send for Circular
FREE! Special Saw Set with each QUICK-WAY
unit purchased; (\$2.75 if ordered separately).

QUICK-WAY SAW CO. 234 Tompkins St. Cortland, N. Y.

BUY DIRECT
• **SAVE ON** •
TILLERS • TRACTORS

Full line of attachments for
mowing, gardening, farming
2-3-4 H.P. TILLERS 12"-16" CUT.

FREE CATALOG
& **PRICE LIST**

5-6-7-9 H.P.
2 wheel &



4 wheel tractors

RED-E TRACTOR CO.

RICHFIELD 4-16th ST., WIS.

ONE BIT FOR ALL

.... **DRILL**
SAW • REAM
CUT



BEAVER
HI-SPEED-SAW
DRILL BITS

Jobber & Dealer
Inquiries Invited

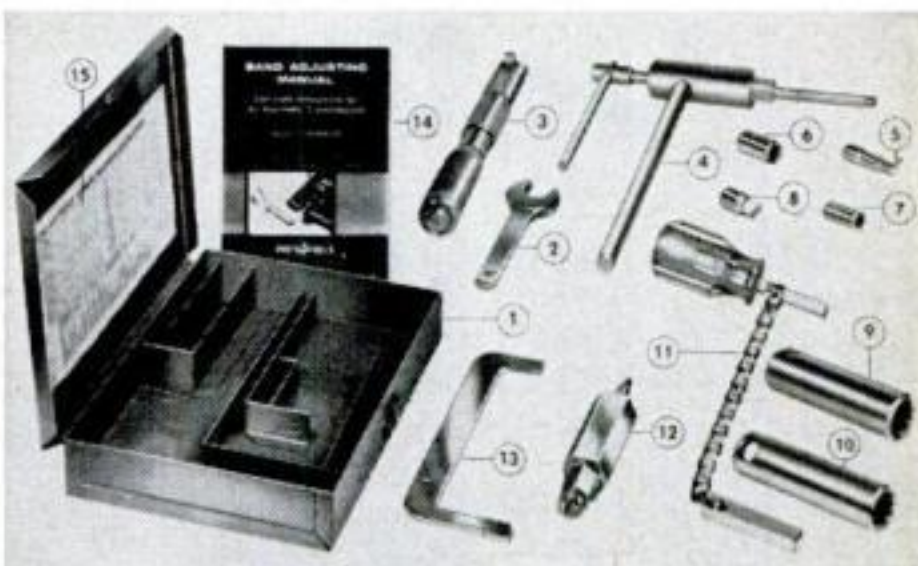
Handiest drill bit made. Use on any
electric drill, lathe, drill press, etc.
Made of finest American hi-speed
steel. 3 1/2" long. 1/4" diameter. Has
2" side-cutting section. Cuts steel,
wood, plastic, aluminum, etc. 3 types
—specify types wanted. (1) All pur-
pose, (2) Wood, (3) Heavy metal.
\$2.45 each — 3 for \$7.00 — Postpaid.
Money back guaranteed. Buy from
your dealer or send check or Money
Order and name of favorite tool
dealer **TODAY.** (Makes ideal gift.)

BEAVER DRILL & TOOL CO., 3008-A McGee Trafficway, Kansas City, Mo.

EASIER, QUICKER BAND ADJUSTING

with **Proto professional tools**

Proto's simplified set makes factory
recommended band adjustments on
all automatic transmissions
with fewer tools. . less cost



PART NO.	DESCRIPTION
1. 9973	Partitioned Metal Box (10-11/16"x8"x1 1/2")
2. 2356	Wrench—open end (5/8")
3. 6061F	Torque Wrench (1/4" drive)
4. 2357	Band Adjuster
5. 4742	Allen Hex Socket (1/4" hex, 1/4" drive)
6. 4710S	Socket—8 point (5/16" op., 1/4" drive)
7. 4710	Socket—6 point (5/16" op., 1/4" drive)
8. 4743	Screwdriver bit (3/8" bit, 1/4" drive)
9. 5324	Socket—12 point (3/4" op., 1/2" drive)
10. 5322	Socket—12 point (11/16" op., 1/2" drive)
11. 2359	Handle and gage (1/4" drive, 1/4" gage)
12. 2354	Servo Gage—Front
13. 2355	Servo Gage—Rear
14. 360	Manual
15. 361	Chart

ANOTHER REASON YOU'LL
PREFER
PROTO
PROFESSIONAL
TOOLS



Precision band adjustments easy and
profitable for any mechanic. Fully
illustrated Manual #2360 shows you
how. Chart #2361 gives factory
specifications. Both included in this
great, new Proto Set #2350.

Write Proto for details **DEPT. A.T.**



2212 Santa Fe Avenue, Los Angeles, Calif • 583 Allen Street,
Jamestown, N.Y. • P. O. Box 366, London, Ontario, Canada



A concrete anchor that cuts its own hole, then expands to become threaded anchor for any standard $\frac{1}{4}$ " bolt. Holds hundreds of pounds. Can't come out. Install by hand in 2 minutes or with impact hammer in 22 seconds.

HOME DRILL AND ANCHOR KIT \$18.5

Driver and 4 Red Heads. \$2.00 (postpaid) by mail if your dealer cannot supply you.

PHILLIPS DRILL CO.
Dept. H-8804
Michigan City, Indiana



NEW FIR PLYWOOD BOAT PLANS

25¢ ea. ★ Designed by leading naval architects for style and top performance
★ Specially planned for "do-it-yourself" construction with fir plywood

Large, easy-to-follow scale plans have step-by-step illustrated instructions and complete material lists

OUTBOARDS

11' (Plan 35)—Fast, roomy car-top utility model.

13' (Plan 40)—Ideal for skiing and fishing or family fun.

16' (Plan 55)—Roomy deluxe runabout. Seats 6 in comfort.

CABIN CRUISERS

18' (Plan 60)—Easy-to-build family day cruiser.

20' (Plan 65)—Sleeps 2. Has galley, head.

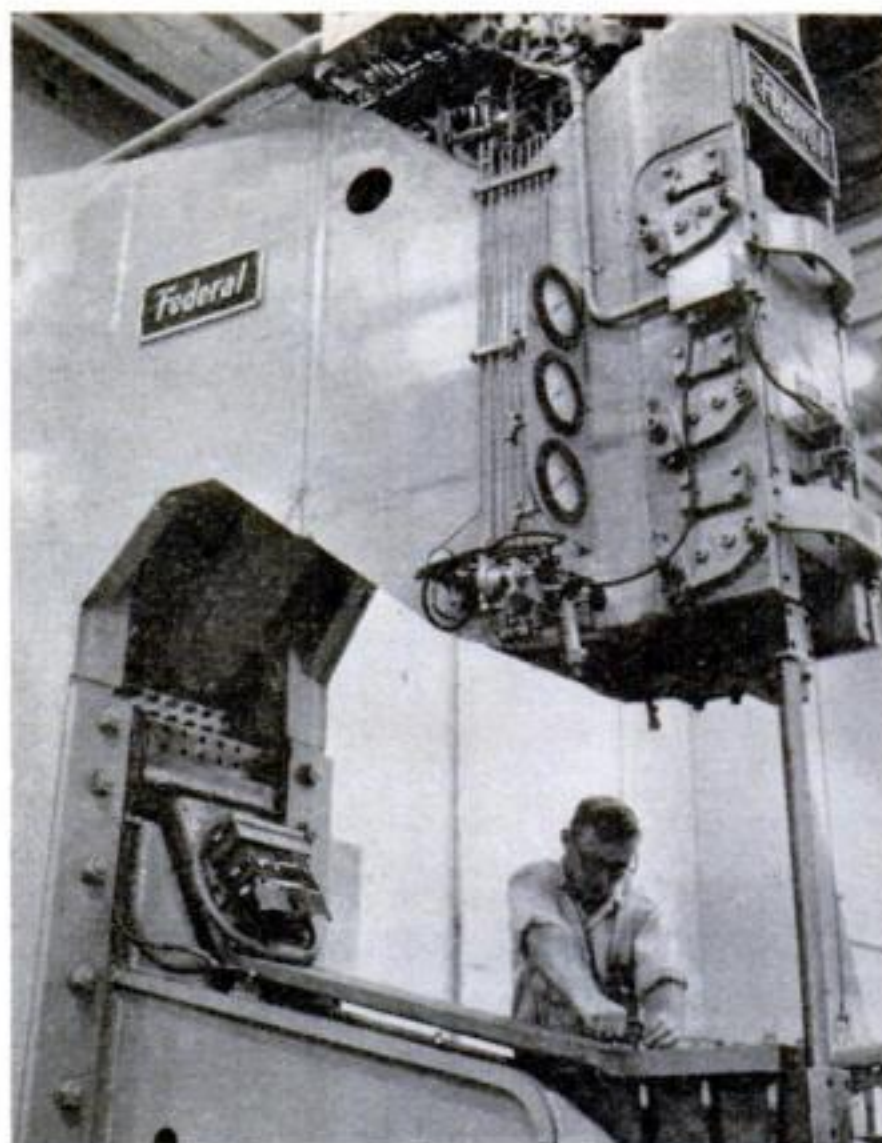
ROWBOATS

8' (Plan 30)—Light, all-purpose pram. Takes small outboard.

14' (Plan 45)—Roomy, flat bottom punt for hunting and fishing.

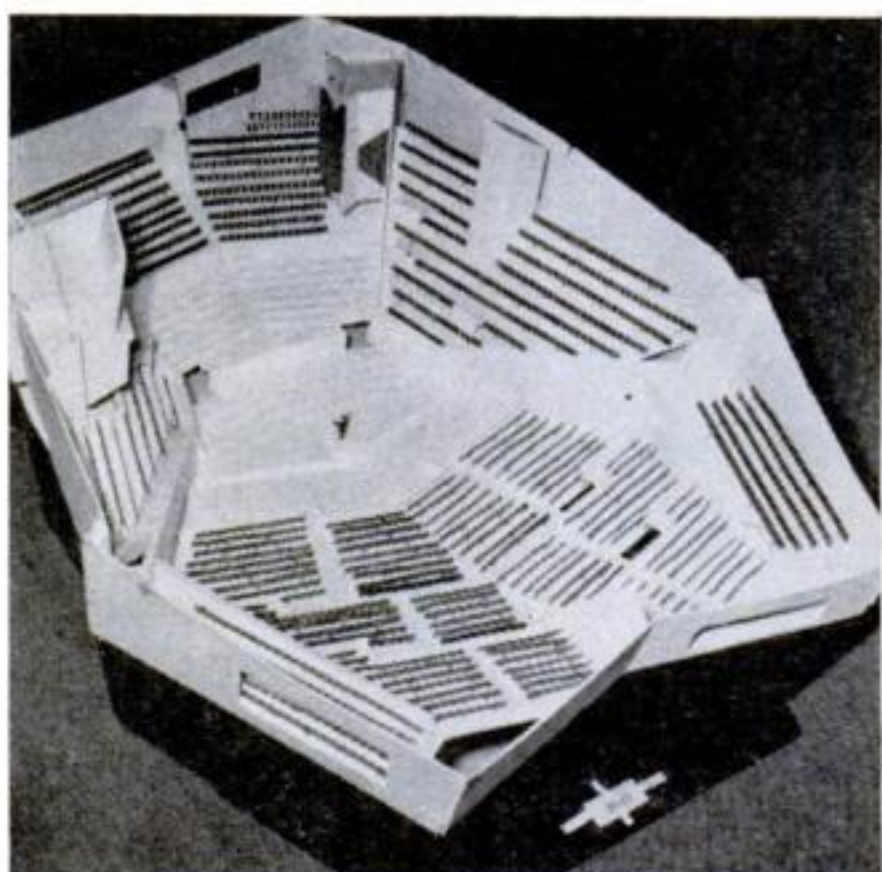
PLANS 25¢ EACH. Order by number. Also write for free folder describing boats in detail. (Offer good USA only). Douglas Fir Plywood Association, Dept. 11, Tacoma, Washington.

Use only Exterior plywood (EXT-DFPA®) for boats. Comes in several sizes, grades—including premium quality solid-core "Marine Exterior" for hull construction.



Spot welder handles big jobs

BIGGEST resistance spot welder, this Federal giant is $13\frac{1}{2}$ feet high, weighs 29 tons. It puts out 100,000 amps to stitch together jet-airliner tail sections in a throat that takes 2,100-square-inch work.



New hall puts music in center

BACH and **Beethoven** will soon resound in a concert hall built like a Greek amphitheater. The model, designed for the West Berlin Philharmonic Society, puts the performers in a central arena and the audience in tiered seats around them.

ACCEPT NO IMITATIONS — BE SURE IT'S A

KING O'LAWN
18" Homeowner
Model Shown

\$149.50

F.O.B. South Gate
California

Total weight of
power mower
115 lbs.



KING O'LAWN,

1958 Model Briggs Stratton
lightweight 4-cycle
engines used.

Dual Automotive
Clutch Control

Mows within 5/8"
of wall, tree, etc.

All chain drive

This mower will
give your lawn that
golf-green carpet look.

That *Forward Throw*

All cuttings are
delivered forward.

KING O'LAWN
Junior model
power edger
trimmer shown.

For edging and
trimming along
sidewalks, curbs and
flower beds.

\$79.50

F.O.B. South Gate
California

Total weight
of power edger
49 lbs.



Edges 5 feet
per second
and trims in
the hard to
get places.

Changes
from edger
to trimmer
in just 3
seconds

4 Models of Power Mowers and 4 Models of Power Edgers from which to choose.
Over 2000 Dealers to serve you. A few choice dealer territories are still available. Please write

KING O'LAWN Inc.

5216 CHAKEMCO ST., SOUTH GATE, CALIF.

P.O. BOX 1068 TWEEDY STATION
SOUTH GATE, CALIFORNIA

DREMEL MOTO-TOOL

Handiest tool you'll ever own. Its high speed (27,000 RPM) is ideal for precision grinding, polishing, carving, drilling, engraving, deburring, sharpening, etc. Eliminates time-consuming hand work. Weighs only 13 oz.—handles easily as a pencil. Does fine detail work with pin point accuracy. Widely used by tool and die makers, model builders, craftsmen, technicians, since 1936.



MOTO-TOOL MODEL NO. 2
(Shown above) \$19.95
MODEL NO. 1 \$12.85

MOTO-TOOL KIT NO. 2 (as shown)

Incl. Model No. 2 Moto-Tool, 23 accessories (high speed cutters, grinder, polishers, etc.) \$27.50

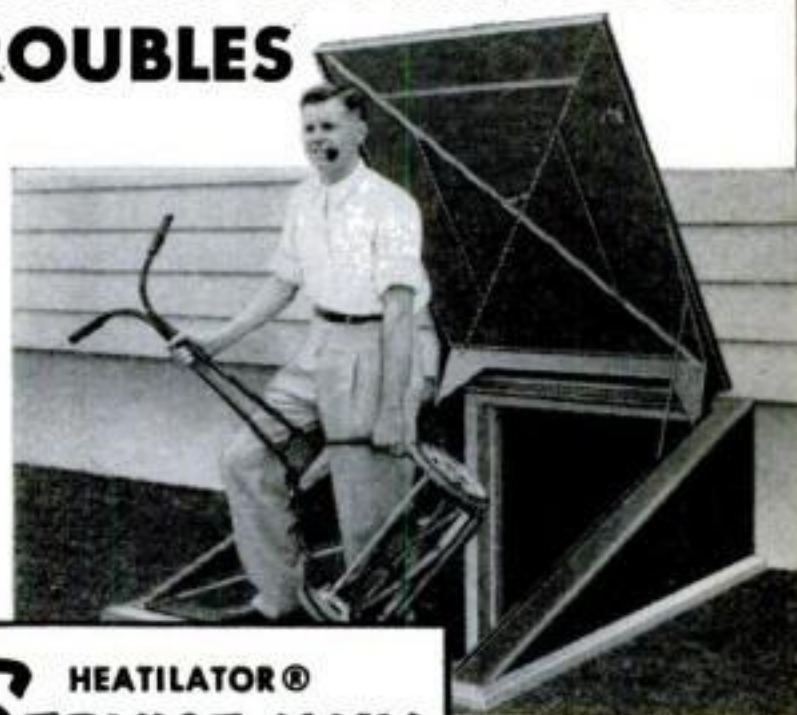
MOTO-TOOL KIT NO. 1 \$21.50

SEE YOUR DEALER or write for FREE catalog on the complete Dremel line of power tools.

QUALITY POWER TOOLS SINCE 1934

DREMEL MFG. CO., Dept. 128D, Racine, Wis.

BANISH CELLAR DOOR TROUBLES



HEATILATOR®
SERVICE-WAY

Model "S"—Single
Door Illustrated

This modern, attractive Service-way eliminates leaks, sagging, rotting wood, broken hardware and unsightliness! Reinforced all-steel construction is weathertight, burglar-proof, and trouble-free. Do-it-yourself simplicity. Available in single and dual door models. If building a new home or remodeling, be sure to use a Service-way. See your building material dealer or write to . . . Heatilator Div., Vega Industries, Inc., 994 E. Brighton Ave., Syracuse 5, N. Y.



FREE! WRITE FOR CATALOG!



Shock-absorbing handle won't loosen

\$5²⁵

Here's the finest hammer made. Shaft is gleaming, chrome-plated tube of boron alloy steel. Strongest ever made. Polished head is locked permanently to shaft. Tough neoprene-fiber cushion grip absorbs shock, won't slip wet or dry or in gloved hand. See ROCKET tools at your hardware store. True Temper, Cleveland 15, Ohio.



Hatchet, belt axe and ball peins, too, in famous ROCKET design that has proved its worth in the hands of over 1,000,000 proud users. Ask a carpenter!

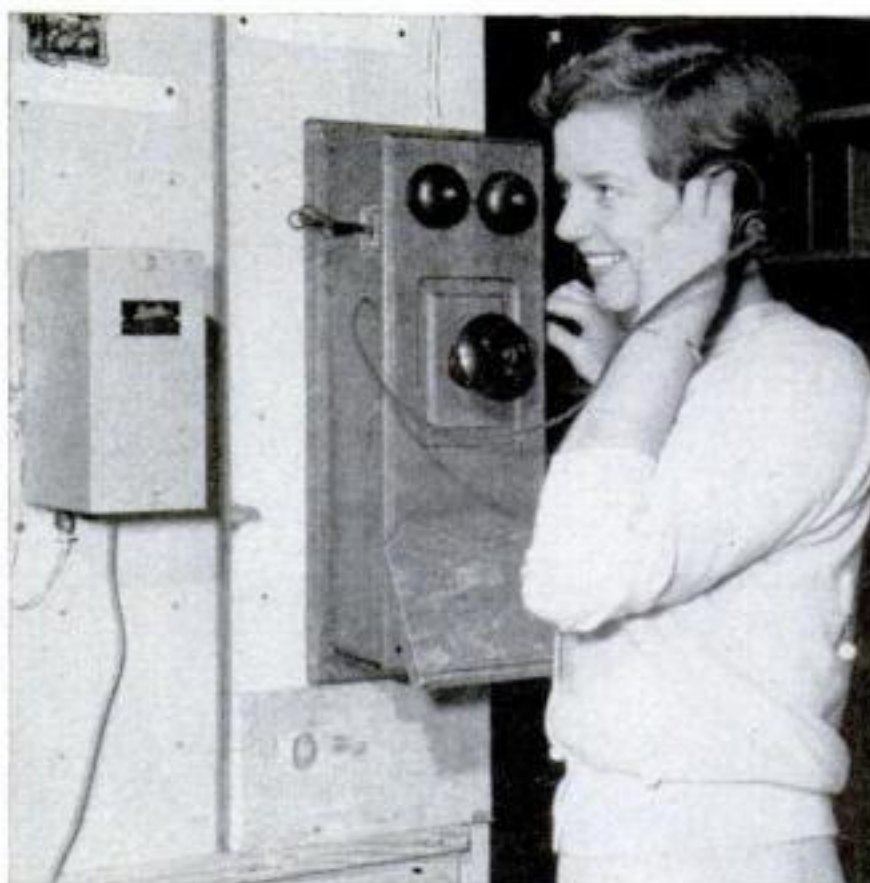
TRUE TEMPER

THE RIGHT TOOL FOR THE RIGHT JOB



Driver faces in any direction

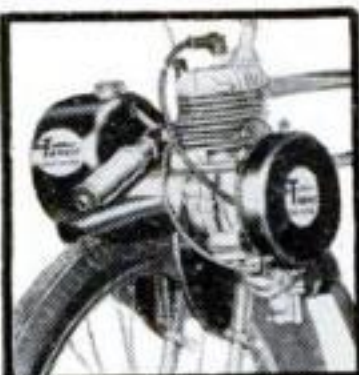
THIS trailer "spotter" jockeys the big carriers around at truck terminals, railroad sidings and marine docks. The driver's seat swivels around the vertical steering column so that, even backing, he always faces the spot he's heading for.



Box sorts calls on party line

A SIGNAL box that sorts out long and short rings and stops constant ringing may ease the nerves of rural party-line telephone subscribers, of which there are still some 2,000,000. It sounds off only when its coded wheel picks up the right signal. Electrical Communications, Inc., San Francisco, calls it a Secoder.

I'll Send You This Famous TRAVIS BIKE MOTOR AT TREMENDOUS 30% SAVING



IF YOU'LL AGREE
TO DEMONSTRATE
TO YOUR
BIKE-RIDING
FRIENDS



AMAZING NEW RIDER-DEMONSTRATOR
PLAN CAN PAY FOR YOUR MOTOR...AND
BRING YOU EXTRA CASH, TOO!

If you'll agree to demonstrate to friends, we'll sell you a rugged, powerful 1½ H.P. world-famous Travis Motor for your own bike at amazing low Demonstrator Price of 30% off! Just ride around town and see how everyone wants a Bike Motor like yours. Only 3 orders and your own Travis is paid for—costs you nothing. Then you keep on making wonderful profits in your spare time!

World's Lowest-Priced Bike Motor... Unequalled Features!

SAFE... mounts on front fork away from rider, always under control of bike brakes. **POWERFUL**... climbs hills, carries heavy loads. **SMOOTH-RIDING**... 2-cycle airplane-type multi-finned air cooled engine, ball bearing construction, direct drive to front wheel (no belts or pulleys to break). **LIGHTWEIGHT**... only 17 lbs., perfectly balanced. **MOUNT IN LESS THAN 30 MINUTES**... anybody can do it with just pliers and screwdriver. **FITS ALL BIKES**... boys' or girls', balloon or lightweight. Motorcycle-type control. Unconditionally guaranteed... carries unique **LIFETIME** Factory Rebuilding Policy.

FREE! Rush name, address NOW for complete details of amazing Rider-Demonstrator Plan that saves you 30% and shows you how Travis pays for itself, makes EXTRA MONEY for you. Everything FREE. No obligation. Write:

TRAVIS PRODUCTS CO., 224 W. Huron, Dept. F-4, Chicago 10, Ill.



America's Finest Cultivator at anywhere near its small price!



only
\$109.50
complete



Now you can no longer afford to do hard spade and hoe work. This powerful (2½ h.p.) self-propelled tiller-cultivator makes gardening a pleasure! Has a beautiful self-propelled 22" twin-spindle rotary mower attachment you can hook on in seconds—for just \$44.50; and the Safe-Speed Edger for only \$27.50. Write today for free folder and nearest dealer's name.

ROTO-HOE, Dept. P-18, NEWBURY, OHIO



132 PAGES
Many in
full color
packed with rare,
fancy & imported
woods... veneers,
plywoods, pat-
terns, tools, orna-
ments, hardware
...everything for
the woodworker.

Get This NEW Catalog of WOOD & WOODWORKING EQUIPMENT

**WORLD'S LARGEST SELECTION OF FINEST
DOMESTIC AND IMPORTED WOODS...
MOULDINGS, HARDWARE, TOOLS...ALL AT
LOW MONEY SAVING PRICES!**

Your complete wood buying guide and project book. Craftsman is your best, most complete source of finest kiln-dried domestic and rare imported woods, beautiful wood inlays, colorful bandings, matched plywoods, embossed mouldings, carved ornaments, newest woodworking tools, "hard to find" cabinet hardware and fittings... more than 1,500 items! Packed with newest scroll saw patterns, project ideas & money making plans. Enclose 25c (refunded with first order) to help pay mailing, handling cost. Write now! **Craftsman Wood Service Co., Dept. B-4
2729 S. Mary Street • Chicago 8, Ill.**

POWER

for even the toughest jobs
in concrete, steel or wood



**650 RPM 3/8" DRILL
MODEL 389**

Other powerful Remington tools



Rugged Model 71—7" circular
saw. Cuts 2" lumber at 45°.



Sturdy Model 31 belt sander.
Belt flush with side for close work.

- 1 Ball and self-lubricating bearings
- 2 Precision, heat-treated gears
- 3 Heavy-duty universal motor
- 4 Quick-release trigger lock
- 5 Geared chuck and key
- 6 Sturdy aluminum-alloy housing
- 7 Heavy-duty cord with ground

Here's exceptional torque and the right speed for drilling in steel, wood, masonry... in fact, almost any material. Drives a full line of heavy-duty attachments. See the Remington Model 389 drill at your dealer's.

Remington

Mall

MALL TOOL COMPANY

Division of Remington Arms Company, Inc., Bridgeport 2, Conn.

In Canada: Mall Tool, Ltd., 36 Queen Elizabeth Blvd., Toronto, Ont.

FREE 16-PAGE CATALOG shows every type of Remington electric tool. Tells what each will do—gives prices and specifications. No cost, no obligation. Just send this coupon.

MALL TOOL COMPANY
Division of Remington Arms Company, Inc.
Bridgeport 2, Connecticut

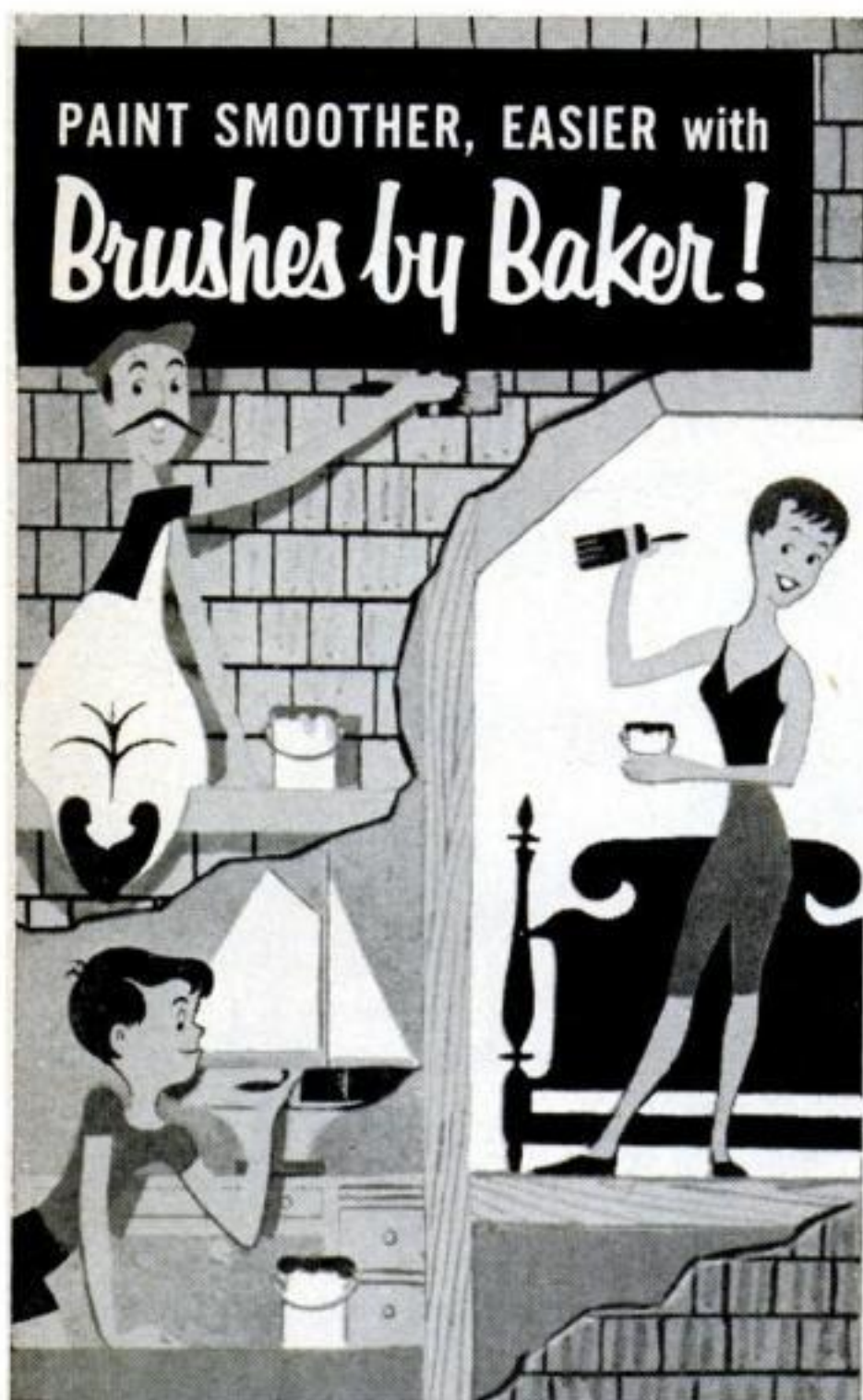
Please send me FREE ILLUSTRATED CATALOG

Name _____
Address _____
City _____ Zone _____ State _____



PS-4

APRIL 1958 259



PAINT SMOOTHER, EASIER with Brushes by Baker!

Use Baker Brushes and paint easier, faster, better! Enjoy smoother painting, use fewer strokes, get more coverage. Next time you paint choose the right Baker Brush size most practical for the job.



learn
to paint
like an
expert . . .

Free booklet tells "HOW TO DO A GOOD PAINT JOB." Today, send card to Baker Brush Co., Inc., 83 Grand Street, New York 13.



BRUSHES BY BAKER

AMERICA'S FINEST PAINTING TOOLS

HOW TO FIX ANY AIR COOLED ENGINE!

New—Third Edition Now Available
GET THE **SMALL ENGINES SERVICE MANUAL** Edited by Engineers and Professional Mechanics **CONTAINS:** 22 makes, 5 more than in 2nd Edition, including Lawn Boy, Lycoming and the famous Italian Vespa Scooter engine and British J.A.P.
NEW AUTHORITATIVE SECTIONS COVER: Gas Engine Fundamentals, Troubleshooting and servicing of ignition and carburetor equipment . . . plus . . . a section on troubleshooting for beginners.

246 pages of practical, down-to-earth information on 2 and 4 cycle engines, 1, 2, and 4 cylinder models. Parts information on more than 17,000 items. Fits and clearances . . . oversizes and undersizes . . . addresses of Parts Distributors . . . Tool requirements. Order now. Price \$4.65. Satisfaction guaranteed or your money back. Send check or money order. Clip this.

SMALL ENGINES SERVICE MANUAL 1014 Wyandotte Street, Dept. H-1, Kansas City 5, Missouri



10" TILT/ARBOR SAW BUILD-IT-YOURSELF from GIL-BILT KITS-PLANS



Sturdy wood, steel, and aluminum construction. NEW DEPARTURE ball bearings. Capacity and performance of floor saws selling for \$150.00 and up. Plans, all metal parts in kit with 10" comb. blade \$25.90, less blade \$22.95. F.O.B. St. Louis. Detail PLANS-PATTERNS only \$1.00 postpaid.

Build-it-yourself 12" and 18" Bandsaws, 6" Belt Sander, Shaper. Simplified plans, build easily with hand tools only. Advertised and sold for 11 years, over 33,000 units in use. Money back guarantee. FREE CATALOG.

GILLIOM POWER TOOLS, Dept. 70-D, Lambert Field, St. Louis 21, Mo.

3 WORKSHOP PLANS TO FIT YOUR SPACE AND BUDGET

Build your own workshop! Get complete plans, easy-to-follow instructions and bills of material for three Delta designed shops—plus Delta's New Workshop Reference Manual. Send name and address with 25c in coin to: Delta Power Tool Division, Rockwell Mfg. Company, 504D No. Lexington Ave., Pittsburgh 8, Pa.



2 WAY PORTABLE RADIO SET

SENDS—RECEIVES UP TO 10 MILES AS SHOWN with built-in antenna or hundreds of miles with outside antennal Works on 80 and 40 meter (Novice) amateur radio-bands—also Aircraft and overseas broadcast (3 to 8 mc). **PORTABLE SELF-CONTAINED POWERED WITH STANDARD PORTABLE RADIO BATTERIES. NO AC PLUG-INS NEEDED!** Take it with you everywhere you go—on trips, vacations, camping—Keep in contact with home, friends. Has 5 watt crystal controlled transmitter—Sensitive Regenerative Receiver. Send-Receive switch. Wt. only 3 lbs. Size, only 6"x4"x4". **TESTED—PROVEN—SIMPLIFIED—PRACTICAL—Full information given on quick easy way to get license.**



SEND ONLY \$3 (bill, ck, mo) and pay postman \$11.95 COD postage on arrival or send \$14.95 for postpaid delivery. Complete kit includes all parts, tube, coils plastoid cabinet, easy instructions. (Set of batteries \$2.95; crystal \$1.25.) **COMPLETELY WIRED AND TESTED. POSTPAID \$19.95.** A regular \$49.95 value—Order now before price goes up. **GUARANTEED—AVAILABLE ONLY FROM:**

WESTERN RADIO

DEPT. BNS-4

KEARNEY, NEBR.

Don't throw it out

Just soak any hard-caked brush in Imperial Rapid Brush Cleaner. It's clean in no time! Ready for instant use. Used liquid can be saved for future use.

At paint and hardware stores.

Write for leaflet on
"Care of Paint Brushes"

Wilson-Imperial Co.,
121 Chestnut St.,
Newark 5, N. J.

IMPERIAL
RAPID BRUSH CLEANER

BOAT KITS BUY DIRECT... SAVE 2/3! NO DEALERS • FREE FREIGHT

SAVE... on the Finest Quality Boat Kits. Lowest Prices, Mahogany Decks, Frames, Prams Racers, Cruisers, Runabouts. Over 40 Models of simple to construct boats and frame kits. SEND 10¢ FOR NEW COLOR CATALOG.... Boats, Paints, Hardware, trailers, fiber-glass etc. Over 2000 items for your boat.

BUY ON EASY
CREDIT TERMS

Boat Plans-Patterns-Frame Kits

Craig Craft
Tonawanda, N. Y.

Build over 50 modern boats from large scale plans, available with FULL-SIZE patterns, new PRE-FAB frame kits! All types: prams to cruisers, 6 to 25 ft. Best buy for Amateurs! SEND 10¢ for CATALOG.



FAUCET WATER HEATER

Instant hot water for just pennies—You just slip MASTER MECHANIC'S new Faucet Water Heater over any faucet—plug it in a wall outlet and you've got steaming hot water instantly for dishes, shaving, washing baby's bottle, etc. Simple and safe—operates on ordinary 110 v. house current—costs only 2 1/2 cents per hour for hot water. Ideal for homes, shops, cabins, trailers, etc. Easily regulated from lukewarm to full hot. Fully guaranteed. (Item 408) Wt. 2 lbs. **\$4.95** Factory price.....

Send 10¢ for 100 page Catalog—FREE with order. Prices f.o.b. factory—Send check or M.O. MASTER MECHANIC MFG. CO., Dept. B-48, Burlington, Wis.



PAGE FOR TILLING PLOWING MOWING

FULL LINE
2 to 6 HP
with complete
gear drive
and reverse.

Free Catalog
LOW PRICES
EASY TERMS
Over 30 Years
Experience

**FULLY
GUARANTEED!**
Over 60
attachments
available!

PAGE 1916-A S. 81st Street
MILWAUKEE, WIS.

**EASIER
FASTER
BETTER!**



KESTER SOLDER

FREE: "Soldering Simplified"
16-page booklet—Send for
your copy today.

For General Soldering

KESTER SOLDER COMPANY

4254 Wrightwood Avenue • Chicago 39, Illinois, U.S.A.

Fast, easy new way to pine plank walls, built-ins, and dadoes



Old Craftsman's two seam-concealing joint patterns give genuine plank effect.

WELDWOOD OLD CRAFTSMAN Pine Paneling

Here are two new Weldwood Paneling firsts that make it easier than ever for you to give your home the charm and beauty of pine planking. Old Craftsman Pine Paneling is genuine clear pine in big easy-to-install plywood panels, precision-grooved to look like real planks.

Two authentic joint patterns

Cape Cod—traditional butterfly joint

Plank—deep, broad V-groove

Paint it or stain it, Old Craftsman offers you countless new decorating possibilities. You can install it yourself—and it's guaranteed for the life of your home!

Free folder in full color gives specifications and decorating ideas for Old Craftsman applications in your home. Mail the coupon today.

Weldwood®



old craftsman
PINE PANELING

United States Plywood Corporation
Box 61, New York 46, N. Y. PS-4-58

Please send me the full-color folder, "Weldwood Old Craftsman Pine Paneling."

Name.....

Street.....

City.....Zone.....State.....

P & C *CLIK-STOP* WRENCH

holds exact jaw openings automatically...

won't work loose

P&C's amazing new Clik-Stop wrench works like an ordinary adjustable. Just turn the patented Golden Knurl, jaw locks automatically at any opening. Pick it up, drop it, kick it... jaw won't work loose or "creep." Chrome plated, backed by famous P&C guarantee. Ask your dealer today about P&C Clik-Stop.

Shop from the colorful P&C tool merchandisers in more than 12,000 stores coast to coast, Send 10c for catalog.



P & C TOOL COMPANY

Box 5926, Portland 22, Oregon
Chicago Warehouse, Box 89, Schiller Park, Ill.

Subsidiary
Pendleton
Tool
Industries

SEALS WEATHER OUT!



Dexall
TRADEMARK

Caulking Compound

- Toughest, most effective seal known
- Remains permanently flexible... will not crack
- In easy-to-use cartridges and cans

At Paint and Hardware Stores Everywhere

DESHLER PRODUCTS INC. • Deshler, Ohio

HOW TO TURN Concrete INTO Gold



A MUST FOR EVERYONE CONCERNED!

This MANUAL Tells You How To Make Handsome Profits From Concrete Items YOU CAN MAKE

All you need is a mold or two and a little determination. This Manual contains large, clear pictures, gives prices and description of more than 200 different molds you can buy direct from the manufacturer, AND... priceless trade secrets that make production a snap. Take the first step Today!!!

SEND ONLY \$1.00 FOR YOUR COPY (Flushed to you by First Class Mail)

CONCRETE MACHINERY COMPANY, INC.
Dept PS Hickory, N. C.

"TI-NEE" BATTERYLESS TUBELESS LIFETIME RADIO

"TI-NEE" RADIO IS GUARANTEED TO WORK FOR YOUR LIFETIME! USES NO TUBES, BATTERIES OR ELECTRICAL PLUG-INS. Never runs down! SMALLER THAN A PACK OF CIGARETTES! RECEIVES LOCAL RADIO STATIONS MOST ANYTIME, ANYWHERE WITHOUT EXTRA ANTENNA. Uses semi-conductor crystal diode HI-Q Tuner. Beautiful black gold plastic cabinet. Built-in Speakerphone.

SEND ONLY \$2.00 (bill, ck, mo) and pay postman \$4.99 COD on arrival or send \$6.99 for postpaid delivery. SENT COMPLETE READY TO LISTEN—NOTHING EXTRA TO BUY EVER! Extra long distance Aerial kit included free to receive stations up to 1,000 miles away. Available only from:

MIDWAY COMPANY, Dept. GPS-4, Kearney, Nebraska



NEW, IMPROVED CALCULATOR FOR WOODWORKERS only 25c



Instantly gives information on lumber, nails, concrete mixes, painting materials, etc. Convenient, simple to read. Just set dial for nail specifications, to convert linear to board feet, find bit sizes for screws, compare characteristics of woods. 6" diameter heavily varnished cardboard. Send 25c, no stamps, please to Greenlee Tool Co., 2124 Columbia Avenue, Rockford, Illinois.

★
8
rollers
per
set.

AMAZING NYLON BEARING DRAWER ROLLERS

Now, in minutes, give a lift instead of a drag to drawers in your home, office, trailer, etc., with amazing "Tiny Tots." Lifetime nylon rollers give finger tip float-action to even the heaviest, stubborn drawers. Stops sawdust from sifting down in drawers, too. Midget in size, but giant in strength! Use 2 on average drawers — 3 on 4 on heavier types. Simple to attach. Send M.O. or check. Dealer Inquiries Invited. No C.O.D.

EDSCO products

2319M W. Washington Blvd., Los Angeles 18, Calif.

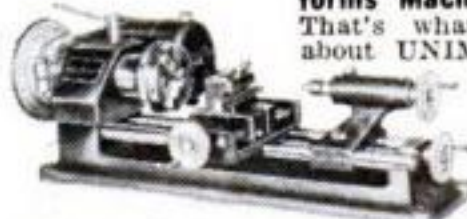


★
SPECIAL
30
rollers
ONLY
22c

Money-back guarantee

"MINIATURE MACHINE SHOP

No Bigger Than A Typewriter, Outperforms Machines Many Times Its Size! That's what Mechanix Illustrated says about UNIMAT in their 3 page feature story in the May issue. If you want a reprint of this story plus complete information about this amazing 10 in 1 combination precision tool write to:



AMERICAN EDELSTAAL, INC., UNIMAT DIV. Dept. 148 350 B'way., N. Y. 13



Works in seconds!

Loosens Rusted Bolts nuts, screws, "frozen" parts!

LIQUID WRENCH

The super-penetrating rust solvent that quickly loosens rust and corrosion.

AT HARDWARE STORES, GARAGES SERVICE STATIONS, EVERYWHERE

RADIATOR SPECIALTY CO.
Charlotte, N. C.



SAW SHARPENING IS EASY

Super Filer No. 11 joints and sharpens hand and circular saws 6" to 10" with all teeth correct in height, depth, pitch, bevel. When file hits hardened steel roller, teeth are finished. Saw runs true with no side pull. Includes 8" file. **\$9.95** ppd.

"TRU-CIRCLE"

saw set automatically sets teeth at 10° or more. **\$2.95** ppd.



DOWEL CENTERS
Centers inscribe exact location for opposite holes. Pairs for 1/4", 3/8", 1/2" holes.

\$1.00 ppd.

SUPER SAW FILER NO. 6

Automatically controls depth, angle, pitch for all saws. Precision made and calibrated. Use in any vise or clamp. Includes file.



\$6.50 ppd.

MONEY BACK GUARANTEE—CATALOG FREE

D. McBURNEY, 5908 Hollywood Blvd., Hollywood 28, Cal., Dept. S-48

4-hr. Diving LUNG

\$59.50



Send for Folder
DIVING INDUSTRIES
WILMERDING, PA.



3-PASS. SPORT CAR
Ideal 2nd Car or Sportabout. Fully Equipped.

Write For Free Catalog.
Special Discount To Dealers.

ESHELMAN TRACTORS

LOW AS **\$99**

Plows - Cultivates - Saws
Cuts - Dozer - Harrows
Hauls - Snow Plow -
Rolls.

Amazing Values!
Write for Catalog of
Eshelman Tractors,
Tillers, Riding Ro-
tary Mowers.



Dept. 306
ESHELMAN
Balto. 2, Md.

Illustration
MODEL
\$199.00

Shipping Points: BALTIMORE -
CHICAGO - LOS ANGELES



Send For Free
"How To Use"
Booklet

SEE THEM AT
YOUR DEALER

SANDVIK STEEL, INC.
1706 Nevins Road
Fairlawn, N. J.



DRAINS cellars, cisterns, wash tubs; IRRIGATES - CIRCULATES - SPRAYS

1,001 uses. Stainless shaft. Won't rust or clog! Uses 1/6 HP motor or larger... 3/4 HP for up to 3000 GPH; 450 GPH 80' high; or 1800 GPH from 25' well, 1" inlet; 3/4" outlet. Coupling included free. **Heavy Duty Ball-Bearing Pump. Up to 7,500 GPH. \$12.95** 1/4" inlet; 1" outlet.

Postpaid if cash with order. Also other sizes, types. MONEY BACK GUARANTEE.

LABAWCO PUMPS, Belle Mead 3, N. J.

Lowest Price
WATER SYSTEM
Completely Automatic!
\$49.95 less motor
With 1/3 HP motor, **\$69.95**
Bronze Gear Pump 275 GPH. 20-40 lbs. 3/4" fittings. Free Circular

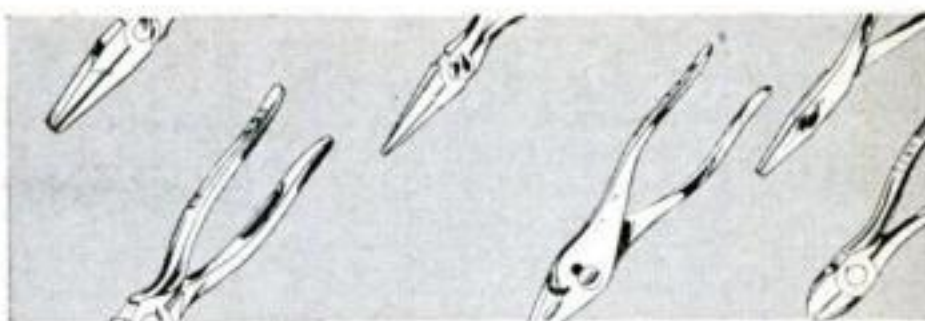
LIMITED SUPPLY! BRAND-NEW, BALL BEARING SINGLE PHASE ELECTRIC MOTORS FAMOUS BRAND! SAVE WAY OVER HALF



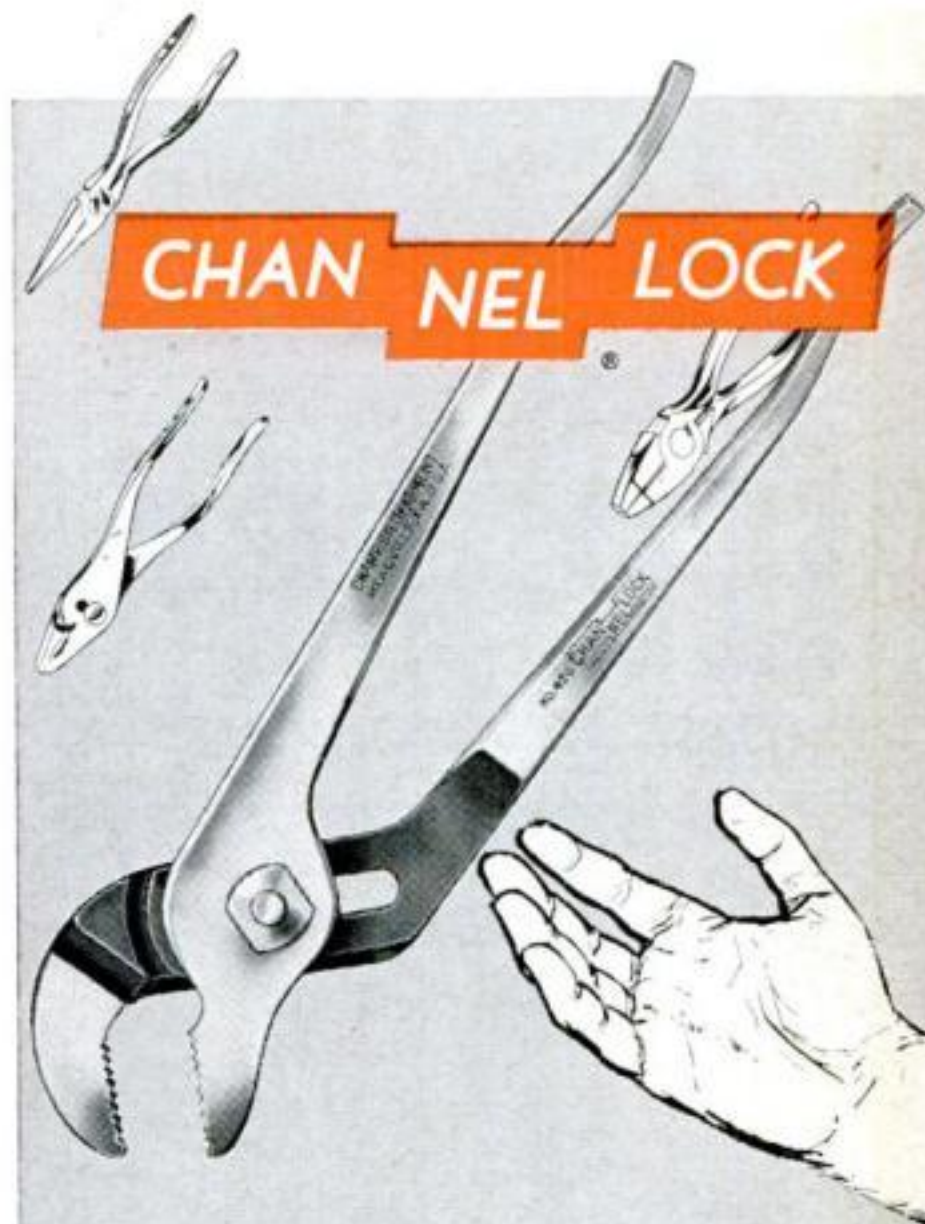
Powerful CAPACITOR MOTORS with heavy starting torques to handle every heavy-duty job. NEW, ball bearing models that mount IN ANY POSITION. 230-Volts. 60 cycle, single phase. Standard mounting and shaft size. PERFECT FOR: re-refrigeration, saws, machine tools, blowers, grain elevators, wood-working tools, pumps and farm equipment. FULLY GUARANTEED! Save \$888.

ORDER DIRECT FROM THIS AD TODAY!

1 1/2 HP (Reg. \$172.00) 1750 RPM, Ball Bearing...only \$57.50 fob
2 HP (Reg. \$231.00) 1750 RPM, Ball Bearing...only \$79.50 fob
3 HP (Reg. \$292.00) 1750 RPM, Ball Bearing...only \$105 fob
Free Catalog of Machinery Wholesale Buys Phone TAYLOR 9-1365
ROBERTS ELECTRIC CO., Dept. PS-775, 849 W. Grand, Chicago 22



skilled hands reach for...



Skilled mechanics . . . thousands of them every year . . . reach for and buy Channellock pliers. Why? Ask them. They'll tell you they like the positive gripping power . . . the rugged strength . . . the precision balance . . . the all 'round handy "feel" of these quality pliers. And you will too!

CHAMPION DEARMENT TOOL COMPANY
MEADVILLE, PENNSYLVANIA

ASK YOUR TOOL SUPPLIER FOR
Genuine CHANNELLOCK PLIERS

GIGANTIC MAIL SALE

WAR SURPLUS
EXCESS INVENTORY
BANKRUPT STOCK



CONTRACTOR-BUILDER-FARMER LEVEL

• Precision quality level by leading mfr. Excellent for setting foundations, grading, farm contouring, surveying, etc. Powerful optically true telescope, finely graduated azimuth scale, sensitive level adjustment, polished oak tripod, 8 1/2 ft. 3-section rod, fine case, instructions, etc. A wonderful buy.

SALE \$42.95 Ppd.

STORAGE BATTERY WINCH

• Powerful fully reversible, ball-bearing gear reduction winch, 1000-2000 lb. pull. Use on 6 or 12-v battery. Holds 40' of 1/4" cable. For trucks, docks, boats, Govt. cost \$280. \$46.75 FOB



AIR COMPRESSOR BARGAINS

For painting, cleaning, tires, control termites. Assemble your own outfit and save money. Lowest prices in U.S.

- Deluxe Kit. Compressor, tank, gauge, regulator, paint gun, relief valve, fittings, hose, instructions. List \$52. SALE \$39.49 FOB
- Air Components. Compressor 1-cyl. \$19.95; Air tank, \$8.79; Regulator \$3.95; Pop-off \$1.95; Press. Gauge \$1.89; Finest Paint Gun \$11.95; Auto Switch \$4.75. All Ppd. in U. S.

HYDRAULIC SPEED REDUCER

• Variable hydraulic speed reducer. Any speed from 50 to 750 rpm by simply throwing a lever. Handle up to 1 1/2 h.p. Use for midget cars, shop band saws, etc. Instant reverse. Govt. cost \$400. SPECIAL \$47.81 FOB

HAND HYDRAULIC SYSTEM

• Brand new Blackhawk hand hydraulic pump. Complete with oil reservoir control valve, built-in relief valve. Pressures to 3000 lbs. Use for wagon unloader, lift truck, shop press, etc. Govt. cost over \$100. SALE \$23.95 FOB

POWER PLANTS & GENERATORS

• Marvelous buys in new condition Govt. and factory surplus plants and generators. Write for catalog.

- 2500-w 115-v 60-c. \$239.50
- 3000-w 115-v 60-c. 299.50
- 5000-w 115-v 60-c. 497.50
- 3KW 115-v DC Generator 49.50

OTHER OUTSTANDING SURPLUS BUYS

- 12"x24" Stainless Stl Air Tank \$16.95 FOB
- Boat & Truck Hand Winch... 8.95 Ppd.
- Hand Crank Fish-Worm Shocker 3.89 Ppd.
- 12-v D-C Bilge Pump..... 9.95 Ppd.
- Modern Dial Telephone..... 9.95 Ppd.
- Govt. Jungle Hammock-Tent... 6.95 Ppd.
- 300 Amp Welding Generator... 23.95 FOB

SPECIAL OF THE MONTH!

FARMER-CONTRACTOR CENT. PUMP

1 1/2" Size, 8400 gph

• Brand new, high capacity, all bronze ball bearing centrifugal pump. Wonderful for irrigation, dewatering and industrial uses.

• 1 1/2" inlet, capacity to 140 gals. per min. Pressure to 70-ft. Speed 3000-3600 rpm. Complete with pulley. Diam. 7"x9"x6". Wt. 18 lbs. List price \$62. SALE \$21.95 FOB

• Hose Special. 20 ft. 1 1/4 in. with threaded fittings. Pressures to 75 lbs. List \$16.50. SALE \$6.29 FOB



ELECTRIC CAR MOTOR

• Use golf or boys electric car. Geared 140 to 1. Run 6 or 12 volt auto storage battery. Easily reversible. Full instr. Wt. 34 lbs. Govt. cost \$250. \$18.95 FOB



MISC. HYDRAULIC BARGAINS

- Tractor Pump 1000 psi 12 gpm. Ppd \$45.50
- Gauges 1000, 1500, 3000 psi (Specy) Ppd 3.49
- Control Valve, 1 & 2 way cyl. Ppd 12.95
- 2-Way Cyl, 3" bore, 6" stroke. Ppd 14.95

Many Hyd. items. Send for catalog.

ORDER FROM AD or write for catalog. Hundreds marvelous mechanical, electronic bargains.

BURDEN SALES COMPANY

826 West "O" St., Lincoln, Nebr.



STICK WITH LEPAGE'S

**BEST KNOWN NAME
IN STICKY STUFF!**



WOOD FINISHING made easy

INTERIOR WOOD PROJECTS Seals, primes, finishes. Nothing else to use from raw wood to bar-top finish. Dries in 30 minutes.

MORE THAN A WOOD FINISH



PROTECTS TOOLS FROM RUST
Coat tools with Deft. Non-Sticky. Makes table-saw tops smoother.

DRAWERS, WINDOWS will not stick. Coat runners & slides for smooth operation.



PROTECTS NEW WOOD against warping, darkening, grime, fingerprints, pencil marks.

See your dealer or write for free Deft booklet.

DESMOND's, 1826 W. 54th St., Los Angeles 62, Calif.

stock your shop

• SCREWS
• BOLTS
• NUTS



DraweRack
without boxes



EASY TO GET AT! EASY TO GET OUT!

Buy your screws in these handy, sparkling, clear-plastic drawer-boxes! Generous quantities of top-quality fasteners at 59c per box. Keep them in the ingenious, multi-purpose DraweRack storage system — ready for quick selection and instant use! At your hardware store...

ALL WOOD SCREWS ARE
SPEEDIZED
FOR EASY DRIVING INTO
EVEN HARDEST WOODS

59¢

PER BOX



ELCO TOOL & SCREW CORP.

ROCKFORD, ILLINOIS

HUNTERS! SALE MK 7 PANTHER

7.62MM (.30) CALIBER MILITARY SURPLUS RIFLES FOR DEER HUNTERS

6-SHOT BOLT ACTION
REPEATING RIFLE SALE!



\$13.85

PLUS FREE AMMO

Includes 12 rds. free target
ammo for testing.

STOCK #ER5C—The Elmer MARK VII PANTHER SPECIFICATIONS: 6-shot bolt action repeating rifle. Caliber 7.62mm (.30). Calibrated, adjustable sights, windage. Rapid action, ideal light trigger pull. Flat trajectory, 2820 F.P.S. Muzzle velocity. Precision milled parts. Our own gunsmiths completely check and pass on every rifle. Guaranteed mechanically perfect or your money back. They are test-fired, cleaned and degreased, then oiled lightly. Stocks are top grade select European wood. We do not refinish stocks at this price, but if you will use a little sandpaper and varnish you will have yourself a beautiful gun. **THESE ARE USED EUROPEAN GUNS** specially selected from pre-World War II period. You will never buy a top grade deer and bear rifle for this price again. These guns are available solely because modern armies are being equipped with new automatic weapons. Softnose hunting ammo, 20 rds., \$2.95; Target Ammo: 100 rds., \$7.50.

FIREARMS CLEARANCE SALE — HUNTERS NOTE!

HUNTERS! 30/06 SPRINGFIELD SALE!



\$29.95

STRAIGHT OUT OF GOVERNMENT BOXES

STOCK #ER23A. Original low serial number U.S. Gov't Springfields. 30/06 caliber. This is the best deer gun you will ever buy. You can get hunting softnose cartridges for this gun in every gunstore or hardware store in the country. Bore is tip-top and sharp. Single Springfields have sold recently for as much as \$45 to \$60. They have been stored in CosmoLine in U.S. Gov't boxes. We clean grease off and oil lightly. **GUARANTEED**. Shoot it, try it. If you don't think this is a fantastic buy send it back (inside 10 days) for full refund. You'll never see them at this price again. Bolt action, 6-shot repeater, famous calibrated sights. **EXTRAS FOR SALE**: New sling, leather, \$1.95; G.I. cleaning rod, \$1.95; O.D. G.I. case with zipper, \$1.95; G.I. cowhide leather saddle case, \$4.95.

HIGH POWER MANNLICHER DEER CARBINE WITH 4X BEAUTIFULSPORTER STOCK COMPLETE AS YOU SEE IT HERE! SCOPE



\$26.75

STOCK #ER4D. All work guaranteed by our own gunsmithing department. This is a beautiful conversion of a powerful Mannlicher Carcano precision military carbine. Our gunsmiths contour the European premium hardwood military stock to perfect sporting lines. Remount and rebed the superb Mannlicher rifle, check headspace, trigger pull. Mount a 4X Pan-Tech telescopic sight with windage and elevation. You will never buy yourself a custom sporter complete and ready to go in this price range again. A \$55 VALUE. Special Purchase of Guns and Scopes — 30 Day Supply — Our Once-in-a-lifetime April Bargain.

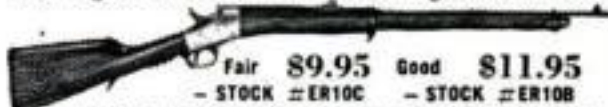
TO ORDER RIFLES, ETC.

ORDER BY STOCK NUMBER FOR FASTER SERVICE. Send check, cash or money order. For C.O.D. send 1/3 or more deposit. All items shipped F.O.B. Los Angeles Expr. charges collect. Calif. resid. add 4% state tax. 10-day money-back guar on all items.

THE ELLNER COMPANY

Dept. 11, 1206 Maple Ave., Los Angeles 15, Calif.

Remington INDIAN WAR Rolling Block Rifles.



Fair \$9.95 Good \$11.95

— STOCK #ER10C — STOCK #ER10B

Here's a beautiful gift for someone's den, A \$19.95 value. These are original Remington's pride of Americana. High power single shot rifle Mod. 1902 excellent for hunting and target use. 30" nitro-proof, high-carbon steel barrel, caliber 7MM Mauser. Lots of target ammo, \$7.50 per 100 rds.

GUNSMITH TO YOU \$19.95



POWERIZED, ACCURIZED

.30Cal. (7.5MM) Big Game Sporter

STOCK #ER21B Starting with a beautiful surplus Swiss army rifle in absolute excellent condition, our own gunsmith machines and precision crowns barrel to 22" sporter length, remounts zeroes in sights, alters the hard mountain (red) walnut stock to sporter contours, rebeds barreled action perfectly, checks headspace, trigger pull (guar. light, crisp). Please return this gun for full refund if it is not perfect in every respect. Bore is perfect. A sporter for all big game. 12-shot bolt action repeater Ammo: softnose hunting, 20 rds., \$3.25.

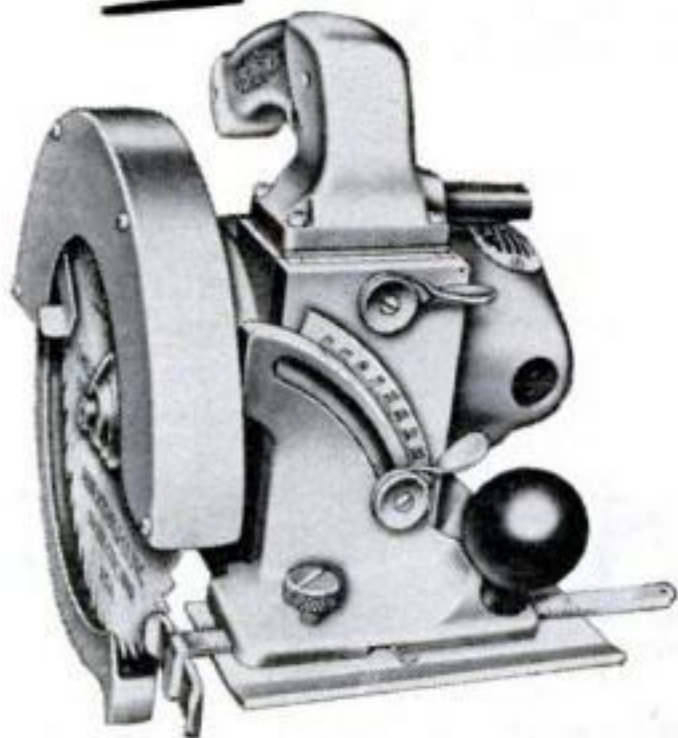
8MM MANNLICHER RIFLE



\$19.95

STOCK #ER3C— 8mm Mannlicher straight pull action short rifle modified at European arsenals to handle the standard 8mm Mauser rimless (7.92x57) Mauser cartridge as loaded by all American cartridge factories. 24" barrel, 5 shot magazine, redesigned so that separate loading clips are no longer necessary, bore good to very good, \$19.95. Target ammo, \$5.95 per 100 rds.

YOUR TIME IS IMPORTANT!



Time is money. And that's the sound dollars and cents reason for owning this modern, powerful, Sioux Electric Saw.

Home projects take shape in a hurry—like the new recreation room, the new garage, the extra bedroom.

Your Sioux Saw hurries things along, and pays for itself in a hurry too!



Look for SIOUX in the
yellow pages under
"Electric Tools"

Write for
Free
Catalog



ALBERTSON & CO., INC. SIOUX CITY, IOWA, U.S.A.

See the **GAY BLADE**

America's Newest
Power Mower



DIFFERENT to look at, easier to handle bicycle-type wheels make the Gay Blade easy to operate.

It's the power mower you'll be proud of for its superior "good looks" . . . its smoother operation . . . its consistently outstanding performance! See it . . . try it . . . you'll want to own the wonderful new Gay Blade. Available in push-style or self-propelled models.

See the Gay Blade complete line of power mowers today or write direct for nearest dealer.

A QUALITY PRODUCT OF
YAZOO MANUFACTURING CO. • JACKSON, MISS.

SUPERSHOP **MAGIC** POWER TOOLS

Only
\$16
each!

GRINDER
SANDER
30" LATHE
8" TILTING
TABLE SAW
HORIZONTAL
DRILL PRESS

5 BIG POWER TOOLS IN ONE
FACTORY TO YOU \$79.95

Only SUPERSHOP can offer you a complete precision-built workshop for \$16 per tool. 100% Ball Bearing. Lifetime accuracy. Rugged frame of heavy steel tubing. Handles big jobs. 8" saw. Sold direct from factory to save you \$65.05. FREE trial. Easy pay plan. Free Catalog.

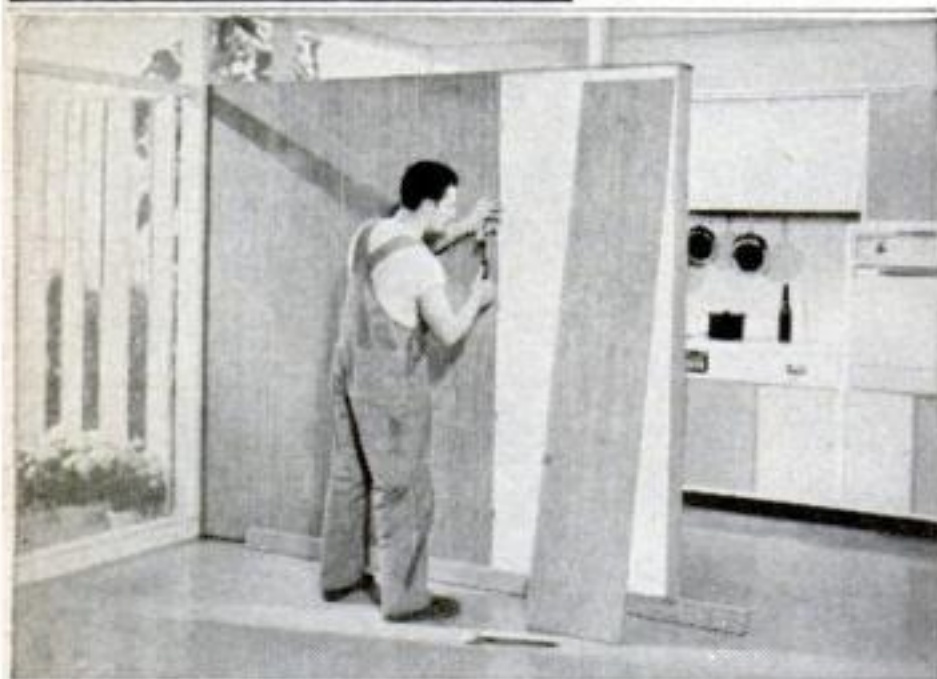


VERTICAL
DRILL PRESS

Write for
FREE Catalog

POWER TOOLS INC.

206 YATES AVE.
BELOIT, WISCONSIN



Modernize a room in a weekend with soilproof Marlite paneling!

In a few hours you can turn an out-moded room into a modern interior with Marlite paneling. Marlite Planks (16" x 8') and Blocks (16" square) go up fast over new walls or old. The soilproof plastic finish resists smudges and stains; cleans with a damp cloth. See your lumber dealer for Marlite in distinctive wood finishes, marble patterns, "Companion Colors"—or write for free decorating ideas book. Marlite Division of Masonite Corporation, Dept. 426, Dover, Ohio.

Marlite

plastic-finished paneling

ANOTHER QUALITY PRODUCT OF MASONITE® RESEARCH

266 POPULAR SCIENCE



Painting is Easy! Electric PAINT SPRAYER

only
\$1295 complete
with built-in
motor
Fully
Guaranteed

Just plug in, pull trigger and spray paint, varnish, enamel, garden sprays and insecticides. 3 to 7 times faster than painting with a brush! Features sapphire nozzle, instant adjustment for heavy or light spray. Foolproof and trouble-free! Available now at dealers everywhere!

Burgess Vibrocrafters Inc.
Grayslake, Illinois



SMALL! POWERFUL!
ECONOMY
TRACTOR

Unequalled value! Low price!
America's finest tractor. Ruggedly built. Easy to operate. 790 lbs. Borg-Warner clutch, trans. and diff 140 to 1 reduction. 40% more drawbar pull than ordinary tractors 8-1/4 H. P. engine. 20 quick change implements. HOOD, FENDERS.

Thousands
In Use
Write for
complete
details.
Engineering Products Co.
Waukesha, Wisconsin
915-A-4 Niagara Ct.



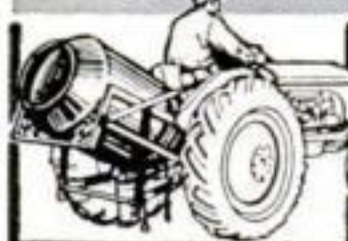
GEARS

In Stock—Immediate Delivery
Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send us your blueprints and inquiries.

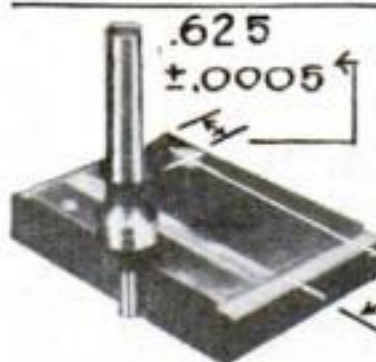
Send for Complete Catalog No. 220
CHICAGO GEARWORKS
440-450 N. Oakley Blvd. Chicago 12, Ill.

at a price YOU
can afford

TRANSMIX
UTILITY MIXER



Mixes while transporting • Dumps hydraulically • Attaches in minutes • No holes to bore • No gears • 1 or 1 1/2 bag capacity • Eliminates wheelbarrows • Unconditional guarantee • For complete FREE folder, write:
UNIVERSAL PULLEYS COMPANY
365 N. Mosley, Wichita, Kansas



MACHINISTS and TOOLMAKERS!

Precision hole location established in less than three minutes, with the WHIZ EDGE FINDER. The modern instrument for precision hole location. \$6.95 ppd. or add C.O.D. charges. SATISFACTION GUARANTEED. Literature and/or dealer's plan on request. PAYS FOR ITSELF!

WHIZ 150 Federal St.
Northampton, Mass.

1.062 ± .0005

NEW MAGIC RADIO WALKIE TALKIE!

YOUR OWN POCKET SIZE RADIO STATION!

BROADCASTS TO ANY HOME OR CAR RADIO WITHOUT WIRES OR HOOKUPS! Wt. only 5 oz. Size (1 1/2 x 2 1/2 x 4 1/2"). Built-in telescoping antenna. Powerful Transistor-sensitive microphone, frequency setter, break-in switch! Runs for weeks on self-contained flashlight batteries. Durable plastic case. With this Radio Talkie you CAN TALK TO YOUR FRIENDS UP TO A BLOCK OR MORE AWAY! Talk up to 1 mile or more between two automobiles. INSTANT OPERATION! Just push button to talk! No license needed. Uses inductive field magnetic radiation. Useful and real fun in a million ways! GUARANTEED TO WORK. 1 YEAR SERVICE GUARANTEE.



SEND ONLY \$3.00. (cash, ck, mo) and pay postman \$9.99 COD postage or send \$12.99 for pre-paid delivery. COMPLETE READY TO OPERATE with instructions and hundreds of ways and tricks for broadcasts thru any radio you desire. Price may go up soon, so get your NEW POWERFUL RADIO-WALKIE TALKIE NOW. Available only from: **WESTERN RADIO**, Dept. RPS-4, KEARNEY, NEBR.

NEW 3400 RPM 1/2 HP POWER SAW

RIPS - CROSSCUTS
CUTS A FINISHED 2x4 LIKE A KNIFE THROUGH BUTTER

COMPARES TO SAWS SELLING UP TO \$49.50 **1998** Complete with 5-1/2" Blade

A rugged, professional type, adjustable saw. Will cut any angle from 0 to 45°. Has an adjustable (0 to 6") rip fence. Safety-trigger switch on handle. Full 1/2 HP Universal AC-DC, 110-120 Volt, 60 cycle motor. Weighs only 6 1/2 lbs.

PHILIPPINE MAHOGANY PLYWOOD

We have shipped over 6 million feet of this handsome paneling in the past year - from Maine to California. Excellent for paneling Dens, Offices, etc. Rotary cut. Both sides sanded. Bonded with finest resin adhesive. Face side jointed. All shipments at lowest truck rates. By from Importer.

3MM (1/8") x 3 FT. x 6 FT. \$5.00 VALUE **179 PER SHEET** **FREE SAMPLE ON REQUEST**

1/4" x 4 FT. x 8 FT. 950 VAL. **449 PER SHEET** **MIN. ORDER 4 SHEETS**

SAVE 50% ON TRANSLUCENT FIBERGLAS PANELS

Finest quality. Available in many widths, and lengths. We shipped over 1 million feet last year to our customers. Full color section. Ideal for Patio, Home, Office. Send for FREE Sample and Booklet TODAY!

49¢ SQ. FT. **85¢ VAL.**

NEW! HEAVY WROUGHT IRON TRELLIS

DECORATIVE! **FLAT TYPE 995** **CORNER TYPE 1795**

INDOORS or OUTDOORS! Heavy 1-1/8" black tubular wrought iron supports with handsome wrought iron fillgree between them. 8 ft. high, 12" wide. Height can be cut to 7 ft. Mounting flange included. Over 1000 have been shipped all over the country. Shipped at Lowest Truck Rates! **SAVE NOW**

NEW 30X-45X STEREO-MICROSCOPE

Ideal for BIOLOGY, BOTANY, ZOOLOGY, DERMATOLOGY, QUALITY CONTROL, WATCHMAKER, TOOLMAKER, METAL WORKING, etc. Buy from Importer and **SAVE!** Here is a top quality instrument made by the finest Japanese optical technicians. Compare these quality features. . . .

1. Rack & pinion adjust.
2. Working distance 3".
3. Side arm rests for long delicate work.
4. Achromatic objective and eye lenses.
5. 3-5/8" stage with sub-stage mirror.
6. 10X & 15X eyepieces with 3X objectives.
7. Six glass slides.
8. Fitted carrying case.

Only 4995 **\$9500 VALUE** **SAVE** **BUY-FROM-IMPORTER**

PALLEY 60 to 450 POWER MICROSCOPE

Another Palley Bargain. Designed for industrial use. Has 1-5/8" to 5" working distance. Large 3-5/8" glass stage & spring clips. Separate eye correction adjustment on one eyepiece. Lenses and other specs. same as above microscope. **ONLY 4995**

80 to 600 POWER - 2 EYEPIECE SPECIAL MICROSCOPE

HAS 80 - 120 - 200 - 300 - 400 & 600 POWER MAGNIFICATION WITH ILLUMINATED SUB-STAGE MIRROR and TRIPLE TURRET

Now you can change magnification with a shift of the dual eyepieces which are 10X and 15X. Has triple revolving turret with 8X, 20X & 40X precision ground and polished lenses. NEW patented sub-stage with built-in light eliminates need of an external light source. Has large sub-stage mirror with revolving, variable iris. All-metal body. Fitted case. **1495**

SAVE UP TO 85% AT PALLEY'S

NEW PAL-MASTER SCOPES
CHOICE OF 4x - 6x

- YOUR CHOICE! SAME PRICE! INCLUDING MOUNT**
- 4X - Overall lgth. 9 3/4" 20 ft. field of view at 100 yds.
 6X - Overall lgth. 10 3/4" 19 ft. field of view at 100 yds.
- \$9.95** **INCLUDING MOUNT** **Specify type Rifle and Model Number - We include proper Mount**
1. POSITIVE INTERNAL ADJUSTMENTS - Direct reading Windage and Elevation knobs marked with easy-to-read micro-adjustments.
 2. ALL LENSES - Top quality optical lens glass - precision ground & polished - color corrected - no spherical aberration or distortion - sparkling clarity.
 3. HARD COATED LENSES - All glass-to-air surfaces meet U.S. Army standards.
 4. EYE RELIEF - 2 1/2 to 4 1/4 inches. Safe to mount on heavy recoil rifles. Good for snap shooting.
 5. EXTRA DURABLE & STURDY - Guaranteed to perform perfectly on ANY rifle.
 6. RETICLE - Sharp, clearly defined Cross Hair.
 7. LOCK-TIGHT EYE FOCUS - Adjustment won't "shoot off".
 8. RUST-PROOF STEEL TUBE.
 9. FREE SCOPE MOUNT - with each scope - designed to fit your rifle - See below.
 10. COMPLETE INSTRUCTIONS - Easy-to-follow for your installation.
 11. Weight only 5 ounces.

SWEDISH FOLDING BAYONET

Another Palley Surplus Bargain. Has a 7 inch blade of finest tool steel. Blade folds into the handle and locks in place with 4 inches of blade exposed. Makes an excellent hunting or diving knife. Comes with all-metal belt scabbard. **298**

SPECIAL ARMY BAYONET

Genuine infantryman's bayonet. Made of finest tool steel. Has fluted sides and precision honed edge. 17" blade can be cut down for skin diving or hunting knife. With scabbard. **298**

27" ARMY MACHETE & CASE

Ideal for clearing brush. Made of finest Vanadium Steel. Has 27" blade. Wood handle. Overall lgth. 27". Complete with rugged belt sheath. Save 85%. . . . **ONLY 198**

FOLDING PARATROOP MACHETE

Blade is finest nickel alloy steel with honed edge. Has heavy duty, easy-grip handle. Blade folds into handle and the special steel guard like a giant pocket knife. When open a safety lock keeps blade rigidly in place. Ideal for camper, cabin, etc. for chopping, cutting, clearing brush, etc. Comes with heavy duty leather holster. Overall lgth. 17". Blade 11". **NEW** **1500 VALUE 389**

PORTABLE SHOVEL **ARMY PICKMATTOK**

198 Has 20" hardwood handle. Blade folds to form pick or shovel. Ideal for emergency.

129 Has 12" steel head with Mattok on one side pick on the other. 16 1/2" handle.

BUILD A SATELLITE CAMERA with this LENS

NEW 3995 **COST GOV'T \$200**

This 7", f/2.5 Eastman Aero Ektar lens was used in taking three of the first photos of the Russian Satellite. It was adopted in a home made camera by a student physicist for this job and we offer his plans FREE with each lens. It has a 178mm focal length with stops from f/2.5 to f/16. Will adapt to 35mm.

AMAZING BARGAIN CATALOG 396 PAGES

From EVERYWHERE PALLEY'S now bring you items of every description! This fabulous catalog contains Hand & Power Tools, Microscopes, Binoculars, Industrial and Building Materials, Housewares, Office Equipment, Sport & Outdoor Equipment, Cameras, Photo Supplies, Hobby Kits & "Gadgets", Electrical & Radio Supplies, Motors & Generators and a HUGE selection of Surplus Hydraulic Cylinders, Pumps, Valves, etc. So many items it's impossible to list them all.

Send 50¢ (for handling & mailing) **50¢ REFUND** on your first order of \$1.00 or more.

Palley's **TERMS:** Send Check, Cash or Money Order. 50% Deposit with C.O.D.s. Prices F.O.B. Los Angeles, Calif. Warehouse.

2263 EAST VERNON AVE. DEPT. PS-48 - LOS ANGELES 58, CALIF.

NOW! HOME CRAFTSMEN CAN OWN THIS PROFESSIONAL ARC WELDER

Trindl **"JOB-TESTER" ARC WELDERS**

FREE **WRITE FOR COMPLETE DETAILS AND EASY PAY PLAN**

Now you can own a Trindl full 125 amp Industrial Welder at a price far less than smaller machines. With a Trindl 125A you can weld metals up to 1/2 inch thick. Operates off either 110 or 220 volt line, properly wired. 16 heat stages from 20 to 125 amps. Make and repair anything of metal around the home, garage, farm or shop, like a professional. No previous experience or training needed. Full "do-it-yourself" instructions with each machine. Complete only \$98.50 f.o.b. factory, or write for details. Trindl manufactures a complete line of heavy duty welding machines. Dealer inquiries invited.

TRINDL PRODUCTS Ltd., Dept. T3-D
1807 So. Clark St., Chicago 16, Ill.

EASY TERMS ONLY \$98.50 F. O. B.

Guaranteed 12 MONTHS IN CONTINUOUS OPERATION

Schupack's Amazing Tool Bargains! Save up to 100%!

ELECTRIC HAND GRINDER
Fits in the palm of the hand and has an air-cooled motor that runs at 20,000 rpm AC or DC at 110 volts. Comes complete with both 3/32 and 1/8 inch Collets, cord and plug. **\$11.50 P.P.**

75 Mounted Wheels & Miniature Cutters. Regular \$11.00 value **\$4.50 P.P.**
For cutting and grinding on wood, metal or plastic. Includes 25 mtd. wheels and points on 3/32" shanks; 24 miniature cutters on 3/32" shanks; 25 short shank min. cutters. Will fit all electric drills and hand grinders.

FLEXIBLE SHAFT—ONLY \$6.50 P.P.
Fits all electric drills & hand power tools 3/4" long. Oilite bearings. Core of specially wound, high carbon steel wire in flexible steel casing. Will accommodate tool shafts up to 1/8" dia. For lathes, electric drills, etc.

2 DRUM SANDERS
With 12 Bands in Assorted Grits. 1/2" dia. x 1" long on 1/8" arbor with 12 bands. **\$1.50 P.P.**
One drum, 1" dia. x 1" long on 1/4" arbor with 6 extra sleeves. **\$1.00 P.P.**

8 Carbon Steel Wood Bits for Brace. Assorted sizes, 3/32" to 3/8", for drilling on wood or metal. **\$1.75 P.P.**

15 Assorted Drills. From 1/16" to 1/2" high speed steel and carbon. Only **\$3.95 P.P.**

30 Assorted Drills. High-speed steel & carbon. Up to 1/2" dia. **\$2.75 P.P.**

10 HIGH SPEED STEEL REAMERS—Straight and Taper Shanks—all brand new and in excellent condition. Reg. \$25.00 **\$4.50 P.P.** value, 10 for **\$45.00 P.P.**

12 Miniature Cutters. For cutting wood, plastic or metal. Assorted shapes on 3/32" shank **\$1 P.P.**

SCHUPACK SUPPLY CO., 7331 COTTAGE GROVE AVE., DEPT S-74 CHICAGO 19, ILL.

SPECIAL—100 PIECES for ELECTRIC GRINDERS
Grinding Wheels, Cut-off Wheels, Sanding Discs, Mounted Stones, Honing Stones, Rotary Cutting Burrs, Mandrels and other items. **\$1 P.P.**

12 MOUNTED WHEELS and points on 1/8" shank **\$2.95 P.P.**
For grinding on plastic, wood, soft & hard metals. Regular Value \$8.40. **18 Mounted points on 3/32" shank \$2.50; 12 mtd. wheels on 1/4" shank \$3.60.**

ADAPTER CHUCK
With 2 interchangeable collets, opening from 3/32" to 1/2". On 1/8" mandrel. **\$1.50 P.P.** Price each only. **Adapter Chuck. From 60 to 80 on 3/32" In. Mandrel \$1.00**

7 H.S. and carbon drills from 6" to 12" in length. Assorted sizes up to 1/4" diam. for drilling in hard to reach places. A reg. **\$1.95 P.P.** \$10.00 val. for only **\$1.95 P.P.**

7 Larger Drills. From 1/4" to 1-1/64". High speed **\$7.50 P.P.** steel and carbon.

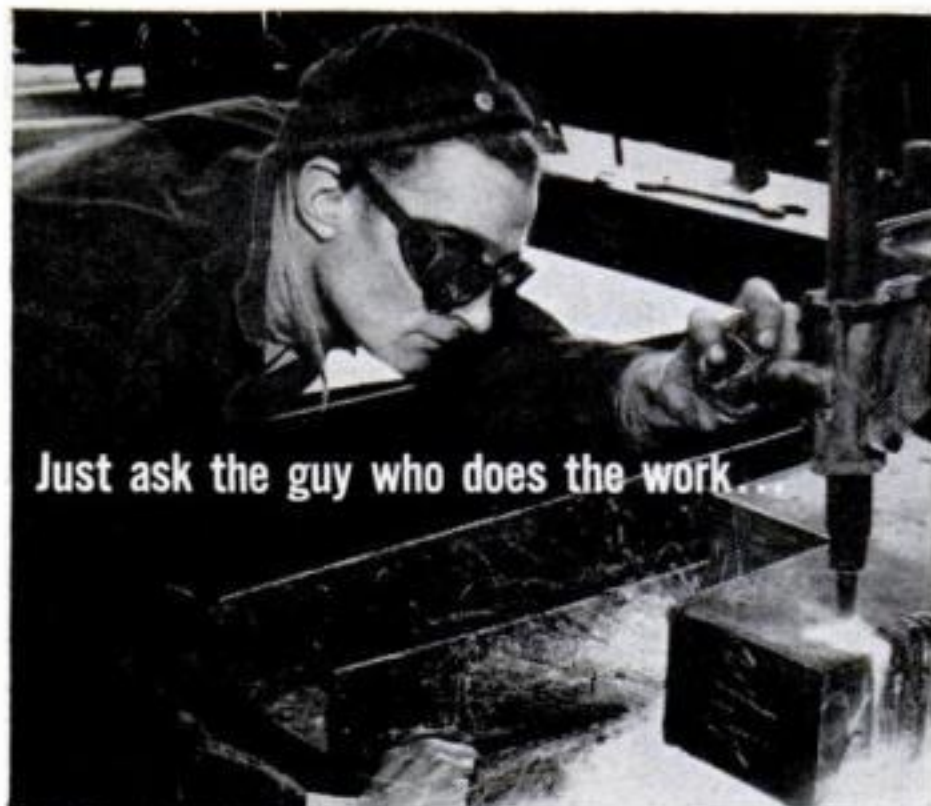
5 Woodworkers Drills. From 1/4" to 3/8" on 1/4" shanks. **\$1.95 P.P.**

2 Circular saws. On 2 Mandrels—all at one low price. 1" diameter saws on 1/8" Mandrels. For cutting wood, plastic or soft metals. **\$1.50 P.P.**

32 H.S. steel drills, threaded shanks from 3/32" to 1/4". Reg. \$9.50 **\$2.00 P.P.** value, only.

18 Rotary Cutters **\$5.85 P.P.** **\$13.50 Value**
Assorted sizes cutter on 1/8" or 3/32" shank. Will fit all hand grinders. Ideal for cutting wood, metal, or plastic. Brand new.

No C.O.D.'s. Catalog 10 cents



Just ask the guy who does the work...

Niagara Falls Machinist says:

"I'm right there! I see how much research, skill and plain hard work goes into today's top products..."

I'm always satisfied most with a **BRAND** that's made a **NAME** for itself!"



"I MADE IT"

MANUFACTURER: "I'm satisfied it's the most modern, the best of its kind on the market. That's the only way to win satisfied customers—with a top quality product. And, that's the way to keep them, too!"



"I SOLD IT"

DEALER: "I know my customer is really satisfied. That's the way with well-known brands. They offer the latest improvements and widest choice. Name brands certainly save everybody a lot of headaches."



"I BOUGHT IT"

CUSTOMER: "I'm satisfied it's the best for my money. I'd be lost without brand names to guide me. My wife and I can even order by phone without taking any risk. We know we're getting what we want."

Better buy by **BRAND NAME** *

BRAND NAMES WEEK
APRIL 13-20th

* the famous makers' names you trust

BRAND NAMES FOUNDATION, INC.

437 FIFTH AVENUE NEW YORK 16, N. Y.



CLOGGED SEWERS? CLEANED INSTANTLY SAVES PLUMBING BILLS —

CHICAGO—Apr. 1st. Just introduced is a Free Booklet on a New Discovery which enables the Home Owner, Janitor, or Factory Maintenance to clean any Clogged Sewer Drain.

Yet anyone can operate this new **Plumbers Flushing Gun** which releases air pressure on a solid shaft of water cleaning the most stubborn stoppages up to 200 feet. **TOILETS, SINKS, URINALS, BATHTUBS, FLOOR DRAINS, and HOUSE-TO-STREET SEWERS** clogged with Grease, Rags, Sand, Roots, and paper melt away instantly when struck by the Hammer-like blow of this new unit.

There is no need to remove wall or pipe, or Grease Trap. A special attachment allows water to flow from the faucet through the Gun while air is released on the pipe. Vents or stacks are no obstacle, as force tends to strike wherever the water lays. But now, what is this Plumbers Flushing Gun worth in **COSTLY PLUMBING BILLS SAVED?** Tear this Ad out—and write your name and address beside it for **FREE BOOKLET.** Obey that urge. No agent will call. A postcard will do (Chicago Phone Kildare 5-1702) **MILLER SEWER ROD CO., DEPT. PS-A 4640 N. Central Ave., Chicago 30, Illinois.**



GENUINE ALNICO MAGNETS

AMAZING, PERMANENT, NON-ELECTRIC, HIGHLY PRACTICAL. Conduct interesting experiments. Hundreds of uses. Retrieve valuable steel items such as guns, tackle from fresh or salt water; tools from tanks & drains. **GUARANTEED.** Try any magnet one week. Money back if you are not well-pleased.

No. S-710 (Wt. 53 oz.) Has pull of 225 lbs. on steel block **\$18.00**
No. S-625 (Wt. 70 oz.) Has pull of 125 lbs. on steel block **\$10.00**
No. S-575 (Wt. 18 oz.) Has pull of 75 lbs. on steel block **\$ 7.00**
No. S-500 (Wt. 13 oz.) Has pull of 50 lbs. on steel block **\$ 5.00**
No. S-300 Kit of Flat Bars 5 Pairs (10 Magnets) **\$ 3.00**
No. S-250 Kit of Round Rods 5 Pairs (10 Magnets) **\$ 2.50**
No. S-47 Hot Pad Magnets 10 for \$1.00 **50 for \$ 4.87**
No. S-35 Hobbyist assortment of 8 small magnets **\$ 1.50**

Send M.O. or check. We pay postage. Sorry no C.O.D.'s.

MIAMI MAGNET COMPANY, 3240 N. W. 27th Ave., Miami 42, Fla.

HUOT ROLLING TOOL CHEST

PROTECTS YOUR VALUABLE TOOLS



MODEL
250

HUOT

Rhymes
With
Do-It'

Goes where your work is! It's a handsome professional piece of equipment!

This complete rolling cabinet is ruggedly built of heavy formed and welded steel for permanent service on the job or in your home workshop. Three top drawers are cork-lined for precision tools—two heavy duty bottom drawers are extra deep for power tools. Complete with built-in lock.

Write for free bulletin showing this and 12 other models!
HUOT MFG. CO., 532 N. Wheeler St., St. Paul 4, Minn.

PLANS · PATTERNS · FRAME PACS

World's Largest Selection. Over 200 new plans, Full Size patterns, frame pacs. Designed for the amateur. Prams, racers, cruisers, utilities, inboards, outboards, in wood, plywood, steel. New longitudinal stressed models with revolutionary bulkhead construction. Light, super strong.

Send 35c for 120 pg. PLAN CATALOG

Catalog plus Boat Building Handbook.....\$1.00

SPECIAL OFFER... Plan Catalog ... plus Hardware and Accessories catalog.....\$1.00

CUSTOM-CRAFT · BUFFALO 7M NEW YORK



SPECIAL I

- 120 PAGE PLAN CATALOG PLUS
- 200 PAGE "BOAT BUILDING FOR THE AMATEUR" COVERS
- BOAT BUILDING FIBER-GLASSING
- OUTFITTING, ETC.

Only \$2.50



NEW!

9.2 H.P. RIDING CRAWLER only \$895 (Blade \$65 extra)

OUTWORKS ANY TRACTOR ITS SIZE

Ideal for clearing, grading, plowing, field or row crops, yard work. Big tractor ruggedness, quality. Anyone can operate. Borg-Warner 3-speed and reverse trans., cone clutch steering. Tractor with blade, floating drawbar, PTO, p.p.d. any-where in U.S. \$960. Wt. 925 lbs. Guaranteed. Accessories available. At dealers or direct.

LAYTRAC
Power! Traction!

LAYTRAC, 2548A4 Airport Way, Seattle 4, Wn.

WORLD PUMPS



Finest Quality Highest Performance—Bronze Impeller—GE Motor, Stainless shaft—Ceramic shaft seal.
1 HP 41 GPM @ 31 Lb \$69.95—
1½ HP 61 GPM @ 32 Lb \$86.95
F.O.B. For 115 or 230 volts A.C.
Built in Thermal Overload Protection

World Sales—Box 885—Ojus, Fla.
\$20.00 deposit on C.O.D.'s



SURPLUS SALE

\$49.50

NEW TOOL POST GRINDERS
REGULAR PRICE \$125.00

1-6 H.P. MOTOR

TAKES WHEELS UP TO 1½"x4"
EXTRA QUILL EXTENSION OR
INTERNAL \$19.50

Less
Grinding
Wheel

MONEY BACK GUARANTEE

EDWARD J. NOLAN, PULASKI, NEW YORK

ELECTRIC WELD - BRAZE & CUT

REPAIR MOST EVERYTHING MADE OF METAL

Home Appliances, Auto parts, Farm-garden equipment, toys, Make and repair playground equipment, lawn chairs, tables, ornamental iron work, gates, wagons, etc. Solder, heat, bend, and straighten, with terrific heat from arc torch. Cut and weld up to 1/4" steel plate. A million uses for home, auto, farm, inventors, factories, etc. Works from any home 110 volt plug-in. Complete with dark welders mask, arc torch, supply of carbon welding and brazing rods. Solder, flux, and complete



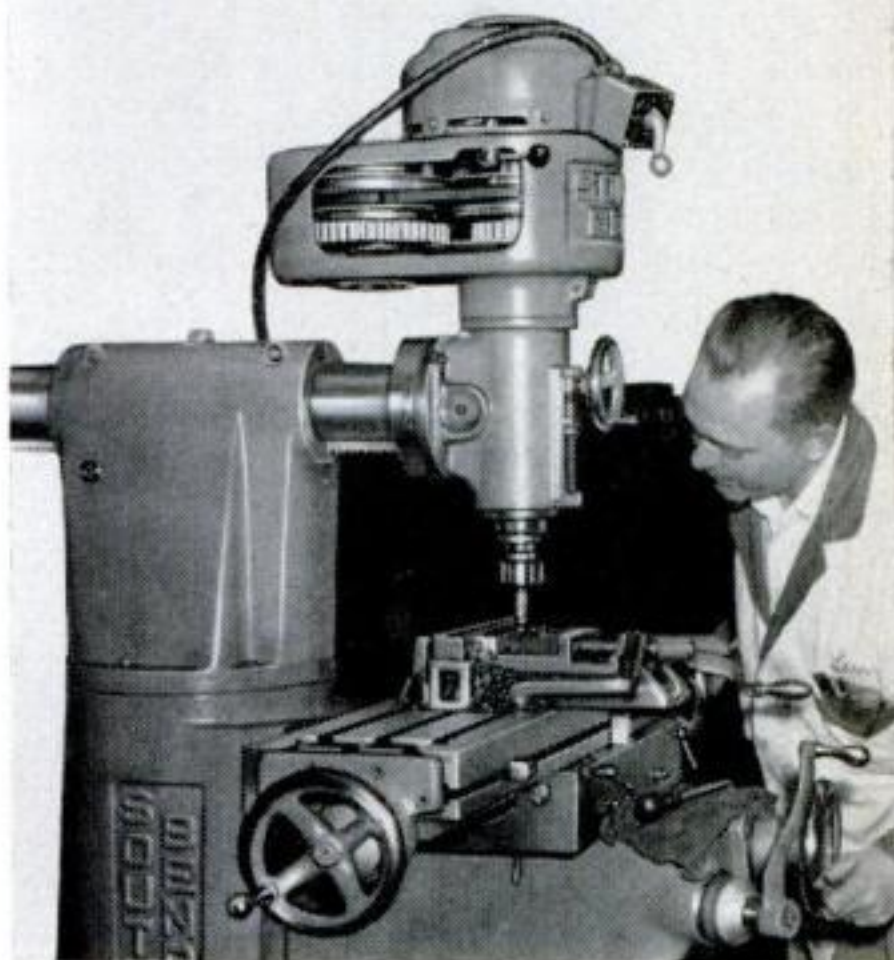
Welding Instruction Book, Attractive—portable—efficient—durable—1 year guarantee. Wt. only 8 lbs.

SEND ONLY \$3.00 (cash, ck, mo) and pay postman \$6.95 plus COD postage on arrival or send \$9.95 plus \$1.50 postage and we will send postpaid. Ideal gift for mechanically minded home owners, relatives, friends. Order now for early delivery. Available only from:

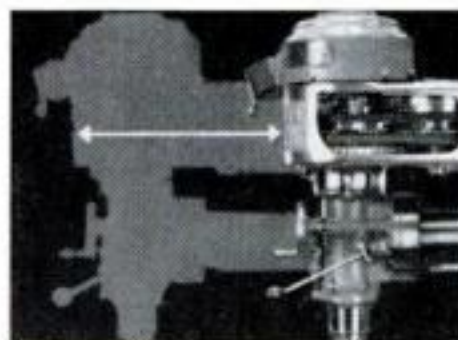
MIDWAY WELDER Dept. DPS-4 Kearney, Nebraska

More Jobs, Faster Set-ups with

SOUTH BEND Vertical Spindle Milling Machine



- Mills—bores—drills—reams at any angle. Head rotates 360° vertically.
- Easy accessibility simplifies job set-ups and tooling changes.
- Fast—positive head indexing and table positioning. Easy-to-read dials.
- Rugged, heavy ribbed column, knee and table.
- 32" or 42" table with 20" or 30" travel.
- Prices start at \$1829 f.o.b. factory.



In or Out Ram Travel
Without Re-setting
Head Angle

Head swivels on ram flange. Ram has a large key sliding in a keyway with an adjustable tapered gib. No side play or canting when ram is moved—always in alignment.

WRITE for complete information on milling machines. Also lathes, turret lathes, shapers, drill presses and pedestal grinders.

SOUTH BEND LATHE
SOUTH BEND 22, INDIANA

Building Better Tools Since 1906



Up to 24
months to pay.

What We Know About the Moon—So Far

[Continued from page 94]

detection by such tests. Even so slight a trace—which does exist, recent optical experiments suggest—would have tremendous consequences.

Imaginative accounts have pictured lunar explorers bombarded with death-dealing meteorites, and forced to take underground shelter. But a trace of atmosphere would suffice to form a "meteor screen" and burn up most meteors before they reached ground, as on earth. The rarity of observed flashes tends to confirm that this is just what happens.

Powerful ultraviolet rays of sunlight, another hazard anticipated for spacemen on the moon, may likewise be filtered out by a lunar atmosphere. But still it must be so rarefied and devoid of oxygen as to be useless for breathing; explorers must bring oxygen along.

Space suits and above-ground living quarters must be insulated against violent extremes of heat and cold—the moon's surface temperature soars to 214 degrees when the sun is overhead, and plummets to 250 degrees below zero at night. Enduring such rigors may seem inconceivable to an earthman—but on the moon, temperature loses its accustomed meaning, as there is practically no air to imprison you in a stifling blanket of heat, nor to drain the body's warmth with polar gales.

A VOYAGER disembarking upon the near side of the moon, and looking upward whence he came, will see a perpetually black, star-studded sky. The glowing earth—four times as wide as the moon looks to us—always hangs overhead, swaying only a little to and fro. And the sun, a blazing beacon, journeys so leisurely across the heavens that a day is about 29 times as long as on earth.

In the sun's glaring rays, the lunar landscape will look as unreal as stage scenery under klieg lights—dazzling highlights, black shadows. Explorers will need their courage to explore craters that reach 183-mile width and 29,000-foot depth.

Rising like an island from the flat lava floor of the Ocean of Storms, majestic Copernicus, "Monarch of the Moon," measures 56 miles from crest to crest. Its ridged and gullied outer slope is a gentle one, and can be climbed with little exer-

tion, since a 150-pound man weighs only about 25 pounds on the moon. From its crest some future Daniel Boone may look down 17,000 feet, past masses of tumbled rock, into an inner amphitheater as large as Rhode Island.

But when an explorer reaches the bottom center of a crater floor, the outer walls may seem to have shrunk or even vanished completely! Why? Because the moon's curvature, much sharper than the earth's, will sink most or all of the towering ramparts below his horizon.

Lunar mountains surpass anything on earth in wild grandeur. For lack of any sea level with which to compare their altitude, it must be compared with nearby terrain. Loftiest of all by this standard, the Leibnitz Mountains near the south pole soar 35,000 feet, more than a mile higher than Mt. Everest.

Strange and varied formations await sightseers: "clefts" or gaping cracks in the ground, surface swellings called "domes," and unexplained whitish "rays" extending from some craters—perhaps streaks of volcanic ash from the last explosions of dying volcanoes. Impressive indeed will be the Straight Wall in the Sea of Clouds—a sheer 800-foot cliff, 60 miles long. Its nearly vertical face remains blistering-hot after the ground has cooled: It gets the setting sun's rays head-on.

Vividly the scenes will contrast with earthly landscapes—for these gaping craters, these jagged mountains, have been untouched by wind, rain or frost.

These ancient scenes will look ghostly because nature has painted them in monotone—shades of ash-gray and black shadow. But picture-takers bent on shooting color film may discover some exceptions. Most noteworthy is a short-lived ruddy glow, first seen in the 1830's near the little crater Lichtenberg. Once, in 1951, it lasted half an hour. Undoubtedly it's seen, the guidebook's author holds, when the sun's rays fall at a certain angle on "some unusual surface deposit"—another first-class mystery for future lunar explorers to investigate. END

"What We Know About the Moon—So Far" is adapted from an article by Alden P. Armagnac (PS, Nov. '53) and is based on the book A Guide to the Moon by Patrick Moore (W. W. Norton & Co., New York 3).

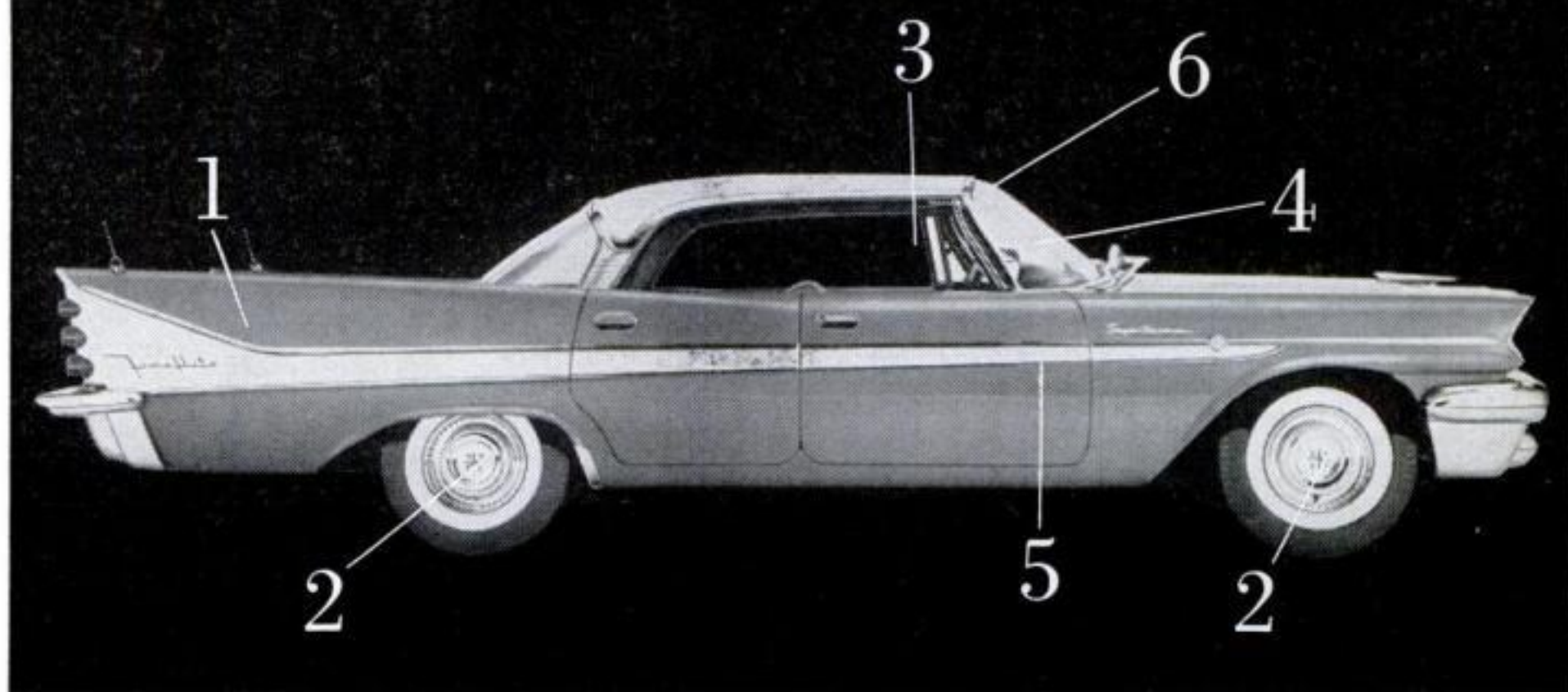
© 1999, 2000, 2001

This One



L7AB-Z66-S4X7

THE ADVANCE DESIGN OF THE *FORWARD* LOOK



WHY IT IS SO RIGHT • WHY IT MEANS SUCH VALUE FOR YOU

In just 12 months more than one million people bought new cars of The *Forward* Look. And nearly half a million switched to them from other makes of car. Their reasons? They're finding more that's new . . . more that's right . . . than they find anywhere else.

1 Take, for example, the rightness of style—the dart-shape of motion. No other design contributes so much to performance. Even cuts steering corrections in cross-winds as much as 20%!

2 There's the wonderful difference of Torsion-Aire Ride. It's America's one new completely different, completely proved system of suspension. So right it prevents starting squat, braking dip, lean on curves. *Yours at no extra cost* in every Plymouth, Dodge, De Soto, Chrysler, Imperial.

3 Pushbutton TorqueFlite — A "first" and so right — found only in cars of The *Forward* Look. Reliable, mechanically-linked control buttons, placed safely at the driver's left. Plus *full control* of automatic transmission with *two* extra selector buttons for such conditions as mud or snow, for downhill engine braking, for flexibility in traffic and up steep hills.

4 New Constant-Control Power Steering makes a wonderful difference, too. It works the right way—full time, not part time. Pioneered by Chrysler Corporation, it takes the work out of steering, yet gives you full control, wonderful new "feel" of the road.

5 Your toe works less, the brakes do more, with Total-Contact braking. The difference here is big and right: quicker straight-line stops with up to 25% less pedal pressure; longer lining life, and only cars of The *Forward* Look have two cylinders working each front brake.

6 You see up to 50% better with Control Tower windshields that sweep back into the roofline to let you look up as well as out. With safety glass all around, of course. The "all outdoors" feeling comes true again in the roominess we give you inside. More, model for model, than any other makes of car!

But the rightness goes further! In every great engineering achievement, in every fine detail of styling, in the total design and total *value* of these cars. It's simply a matter of giving you more for what you pay. But don't just look at a great '58 of The *Forward* Look—drive around, and discover the rightness for yourself!

CHRYSLER CORPORATION ➤ **THE *FORWARD* LOOK**
PLYMOUTH • DODGE • DESOTO • CHRYSLER • IMPERIAL

"HOW A 'CRAZY RUMOR' GOT ME PROMOTED!"



What I overheard one morning shook me right out of a rut!

"Company's getting ready to cut back . . . bound to be layoffs," I heard them say. "Just another crazy rumor," I told myself.

Just the same, I took quick stock of myself that night. Came up with four good reasons why the company would keep me on:

*Three years' experience
Getting along with foreman
Turning out acceptable work
Prompt and dependable*

And four just-as-good reasons why they might let me go:

*Making no real headway
Others better qualified
Still rated "semi-skilled"
Needs special training*

I wasn't in trouble. But I sure wasn't "in solid" like I should be. That's when I made up my mind to enroll for training with I.C.S.

I picked I.C.S. because it's the oldest and largest with 257 courses. The training is quick and thorough. It's recognized by my company and accredited by the National Home Study Council. You study in your spare time and get personalized, practical instruction—know-how you can apply next day on the job.

That was a year ago. There have been two layoffs since then. While some of the others were just hanging on or being released, I was moving up. My I.C.S. training started something. Not only did it get me promoted (with a fat pay hike), but it put me in line for real advancement.

Don't wait for a "crazy rumor" to set you straight. Take out your "job insurance" right now. Mail the coupon and get full, free details on how I.C.S. has helped thousands, how it can help you. No obligation—and you get three valuable books *free!* (1) How to Succeed; (2) Catalog of opportunities in the field of your choice; (3) Sample lesson (math).

For Real Job Security—Get an I. C. S. Diploma! I. C. S., Scranton 15, Penna. Accredited Member, National Home Study Council

INTERNATIONAL CORRESPONDENCE SCHOOLS



BOX 73314D, SCRANTON 15, PENNA.

(Partial list of 257 courses)

Without cost or obligation, send me "HOW to SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X (plus sample lesson):

- ARCHITECTURE and BUILDING CONSTRUCTION**
- ☐ Air Conditioning
 - ☐ Architecture
 - ☐ Arch. Drawing and Designing
 - ☐ Building Contractor
 - ☐ Building Estimator
 - ☐ Carpentry and Millwork
 - ☐ Carpenter Foreman
 - ☐ Heating
 - ☐ Interior Decoration
 - ☐ Painting Contractor
 - ☐ Plumbing
 - ☐ Reading Arch. Blueprints
- ART**
- ☐ Commercial Art
 - ☐ Magazine & Book Illus.
 - ☐ Show Card and Sign Lettering
 - ☐ Sketching and Painting
- AUTOMOTIVE**
- ☐ Automobiles
 - ☐ Auto Body Rebuilding and Refinishing
 - ☐ Auto Engine Tuneup
 - ☐ Auto Technician

- AVIATION**
- ☐ Aero-Engineering Technology
 - ☐ Aircraft & Engine Mechanic
- BUSINESS**
- ☐ Accounting
 - ☐ Advertising
 - ☐ Business Administration
 - ☐ Business Management
 - ☐ Cost Accounting
 - ☐ Creative Salesmanship
 - ☐ Managing a Small Business
 - ☐ Professional Secretary
 - ☐ Public Accounting
 - ☐ Purchasing Agent
 - ☐ Salesmanship
 - ☐ Salesmanship and Management
 - ☐ Traffic Management
- CHEMICAL**
- ☐ Analytical Chemistry
 - ☐ Chemical Engineering
 - ☐ Chem. Lab. Technician
 - ☐ Elements of Nuclear Energy
 - ☐ General Chemistry
 - ☐ Natural Gas Prod. and Trans.
 - ☐ Petroleum Prod. and Engr.
 - ☐ Professional Engineer (Chem)
 - ☐ Pulp and Paper Making

- CIVIL ENGINEERING**
- ☐ Civil Engineering
 - ☐ Construction Engineering
 - ☐ Highway Engineering
 - ☐ Professional Engineer (Civil)
 - ☐ Reading Struc. Blueprints
 - ☐ Structural Engineering
 - ☐ Surveying and Mapping
- DRAFTING**
- ☐ Aircraft Drafting
 - ☐ Architectural Drafting
 - ☐ Drafting Machine Design
 - ☐ Electrical Drafting
 - ☐ Mechanical Drafting
 - ☐ Sheet Metal Drafting
 - ☐ Structural Drafting
- ELECTRICAL**
- ☐ Electrical Engineering
 - ☐ Elec. Engr. Technician
 - ☐ Elec. Light and Power
 - ☐ Practical Electrician
 - ☐ Practical Lineman
 - ☐ Professional Engineer (Elec)
- HIGH SCHOOL**
- ☐ High School Diploma

- ☐ Good English
 - ☐ High School Mathematics
 - ☐ Short Story Writing
- LEADERSHIP**
- ☐ Industrial Foremanship
 - ☐ Industrial Supervision
 - ☐ Personnel-Labor Relations
 - ☐ Supervision
- MECHANICAL and SHOP**
- ☐ Diesel Engines
 - ☐ Gas-Elec. Welding
 - ☐ Industrial Engineering
 - ☐ Industrial Instrumentation
 - ☐ Industrial Metallurgy
 - ☐ Industrial Safety
 - ☐ Machine Design
 - ☐ Machine Shop Practice
 - ☐ Mechanical Engineering
 - ☐ Professional Engineer (Mech)
 - ☐ Quality Control
 - ☐ Reading Shop Blueprints
 - ☐ Refrigeration and Air Conditioning
 - ☐ Tool Design
 - ☐ Tool Making
- RADIO, TELEVISION**
- ☐ General Electronics Tech.

- ☐ Industrial Electronics
 - ☐ Practical Radio-TV Eng'r'g
 - ☐ Practical Telephony
 - ☐ Radio-TV Servicing
- RAILROAD**
- ☐ Car Inspector and Air Brake
 - ☐ Diesel Electrician
 - ☐ Diesel Engr. and Fireman
 - ☐ Diesel Locomotive
- STEAM and DIESEL POWER**
- ☐ Combustion Engineering
 - ☐ Power Plant Engineer
 - ☐ Stationary Diesel Engr.
 - ☐ Stationary Fireman
- TEXTILE**
- ☐ Carding and Spinning
 - ☐ Cotton Manufacture
 - ☐ Cotton Warping and Weaving
 - ☐ Loom Fixing Technician
 - ☐ Textile Designing
 - ☐ Textile Finishing & Dyeing
 - ☐ Throwing
 - ☐ Warping and Weaving
 - ☐ Worsted Manufacturing

Name _____ Age _____ Home Address _____
City _____ Zone _____ State _____ Working Hours _____ A.M. to P.M. _____
Occupation _____

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special tuition rates to members of the U. S. Armed Forces.

Over and over again—It's the same old story...

Finally a formula that really works



I was ashamed to always be so tired!

ALWAYS felt simply "run down". People were thinking of me as a "spoil-sport". I didn't know why until my doctor explained why I felt "tired"... why my youthful vigor was slipping away... why my wife and family were beginning to think of me as a worn-out man. He told me how a vitamin-mineral deficiency in my diet could rob me of the joys of living... and suggested that I supplement my diet with pep-building vitamins and minerals.

Well, I put off doing anything about my condition—until one day I sent for a 30-day FREE supply of high-potency Vitasafe

C. F. Capsules and began taking one Capsule a day. In a short time, I began to feel like a new man! My pep and vigor came back, I continued with the Vitasafe Plan—and I felt stronger, younger, more energetic!

Today, no one thinks of me as a "worn out old man". I've got pep and energy to burn, and I have fun like a fellow half my age! And you may too! Why don't you take advantage of this sensational free offer to see for yourself whether you, too, can again feel peppy and full of life! Mail the postcard today and accept this no risk offer as I did.

Our fights have turned to kisses!

IT'S hard to believe that my wife and I used to fight. She would start nagging at me the minute I got home from work—dead tired—and I would snap right back at her! We argued and bickered so often that we suddenly realized our marriage was breaking up! There wasn't any real reason for it except that both of us felt so tired all the time that we got on each other's nerves.

Our family doctor gave us some advice that probably saved our marriage. Many people, he told us, become worn-out, tense and short-tempered because their diets do not contain

enough vitamins, minerals and lipotropic factors. To correct this condition, each of us started taking Vitasafe High-Potency Capsules—just one a day. It wasn't too long until we had more pep, more energy—and our dispositions improved. Instead of fighting, we were back in each other's arms—just as we were on our honeymoon.

If you or your wife—or some other member of your family—have lost the pep and energy you used to have, you owe it to yourself to try proven Vitasafe High-Potency Capsules for 30 days at our expense and judge the results for yourself!



EACH DAILY VITASAFE CAPSULE CONTAINS

Choline Bitartrate	31.4 mg.	Niacin Amide	40 mg.
Inositol	15 mg.	Calcium Pantothenate	4 mg.
dl-Methionine	10 mg.	Vitamin E	2 I.U.
Glutamic Acid	50 mg.	Folic Acid	0.5 mg.
Lemon Bioflavonoid Complex	5 mg.	Calcium Phosphorus	75 mg.
Vitamin A	12,500 USP Units	Iron	58 mg.
Vitamin D	1,000 USP Units	Cobalt	30 mg.
Vitamin C	75 mg.	Copper	0.04 mg.
Vitamin B ₁	5 mg.	Manganese	0.45 mg.
Vitamin B ₂	2.5 mg.	Molybdenum	0.1 mg.
Vitamin B ₆	0.5 mg.	Iodine	0.075 mg.
Vitamin B ₁₂	2 mcg.	Potassium	2 mg.
		Zinc	0.5 mg.
		Magnesium	3 mg.

We invite you to compare the richness of this formula with any other vitamin and mineral preparation.

SPECIAL FORMULA FOR WOMEN ALSO AVAILABLE.

FREE 30 DAYS High-Potency Capsules

LIPOTROPIC FACTORS, MINERALS and VITAMINS

Safe nutritional formula containing 27 proven ingredients: Glutamic Acid, Choline, Inositol, Methionine, Citrus Bioflavonoid, 11 Vitamins plus 11 Minerals

**POTENCY AND PURITY
GUARANTEED**

To prove to you the remarkable advantages of the Vitasafe Plan... we will send you, without charge, a 30-day free supply of high-potency VITASAFE C.F. CAPSULES so you can discover for yourself how much healthier, happier and peppier you may feel after a few days' trial! Just one of these capsules each day supplies your body with over twice the minimum adult daily require-

You can use these Capsules confidently because U. S. Government regulations demand that you get exactly what the label states—pure ingredients whose beneficial effects have been proven time and time again!

CHECK POSTCARD IF DESIRED



stop dreaming...

*price it at
your Evinrude
dealer*

You can buy this dream! If you doubt it—look out across the sparkling blue water any golden day this spring. See the “Evinrude-powered” families at play. They’re no richer than you—except in living life to the fullest!

Boys and dads by the millions—and mothers and daughters, too—are finding a deeper source of companionship, sharing the fun of cruising, fishing, skiing, exploring a new world of adventure afloat.

Dreaming won't do it... but your Evinrude dealer will. He'll show you how easy it is to own the boating outfit of your dreams. Furthermore, he'll gladly take you and your family for a “Revelation Ride”... let you try, first hand, Evinrude's mighty Starflite V-4, the low-priced, high-powered Four-Fifty, the brilliant new Lark (all with Starflite sound-sealed quiet, Starflite floating-power smoothness)... or any of 8 other dashing new Evinrudes in a size and price to match your needs and budget.

See your Evinrude dealer *now*. His name is listed under “Outboard Motors” in the yellow pages of your phone book. For complete catalog in full color, write Evinrude Motors, 4237 N. 27th Street, Milwaukee 16, Wisconsin.

A Division of Outboard Marine Corporation
In Canada: Mfd. by Evinrude Motors, Peterborough

EVINRUDE

quiet outboard motors